Society for Developmental Biology 79th Annual Meeting ONLINE
July 9 - 15, 2020

Program Committee: Alejandro Sánchez Alvarado (Chair, SDB President, Stowers Institute for Medical Research), Celina Juliano (University of California, Davis), Otger Campàs (University of California, Santa Barbara), Manu Prakash (Stanford University)

Local Organizing Committee: Carole LaBonne (Chair, Northwestern University), Naiche Adler (University of Illinois at Chicago), Jorge A. Cantú (Northeastern Illinois University)

ALL TIMES ARE US/CANADA EASTERN DAYLIGHT TIMES (UTC/GMT-4)

WEDNESDAY JULY 8 (Pre-Meeting Events)

Society for Developmental Biology 8th Boot Camp for New Faculty

10 am – 7 pm Drill Sergeants: Kara Cerveny (Reed College) and Guillermo Oliver (Northwestern University)
Limited to attendees selected from pool of applicants.

Satellite Symposium - Emerging Leaders in Live Cell Imaging Approaches of Developmental Biology
Sponsored by Mizar Imaging, LLC

Co-organizers: David Q. Matus and Rebecca Adikes (Stony Brook University)

Session I: Innovations in live cell imaging of developmental biology - Part I

12:55 pm Symposium introduction by David Q. Matus and Rebecca Adikes (Stony Brook University)

1:00 pm Vanessa Barone (Scripps Institute of Oceanography/University of California, San Diego) A real time look at cell differentiation within echinoderm embryos

1:20 pm Erica Hutchins (California Institute of Technology) Imaging RNA decay during the neural crest epithelial—mesenchymal transition

1:40 pm Bin Gu (SickKids Research Institute/University of Toronto, Canada) Light up the embryos: Efficient generation of knock-in reporter mice by 2C-HR-CRISPR

2:00 pm Hidehiko Hashimoto (University of Chicago) Dynamic integration of cell-cell signaling, force generation and tissue remodeling control zippering and neural tube closure

2:20 pm Virtual Coffee Break

Session II: Innovations in light sheet microscopy design

2:40 pm Alfred Millett-Sikking (Calico) A bolt-on single-objective light-sheet design with uncompromised numerical aperture

3:00 pm Citlali Perez-Campos (Columbia University) SCAPE microscopy for high-speed imaging of in-vivo dynamics

3:20 pm Tian-Ming Fu (Janelia Research Campus/HHMI) Imaging Biology in Native State: From Single-Molecule Dynamics to Whole-Organism Development
3:40 pm  Virtual Coffee Break

Session III: Innovations in live cell imaging of development - Part II
4:00 pm  Akanksha Jain (ETH Zürich, Switzerland) 4D quantitative lightsheet imaging and analysis to study developing embryos and organoids
4:20 pm  Elizabeth Haynes (University of Wisconsin, Madison) Branching out: kinesin light chains in the development of neuronal morphology and function
4:40 pm  Rebecca Green (Ludwig Institute for Cancer Research, University of California, San Diego) 4D High Content Imaging and Automated Phenotypic Profiling of C. elegans Embryogenesis

Session IV: Innovations in image analysis
4:00 pm  Meghan Driscoll (University of Texas Southwestern Medical Center) Regulation of Intracellular Signaling via Cellular Morphology
4:20 pm  Break
4:30 pm  Breakout Sessions

THURSDAY JULY 9
Presidential Symposium – Development at Multiple Scales  Sponsored by WIREs-Developmental Biology
Chair: Alejandro Sánchez Alvarado (Stowers Institute for Medical Research)
11:15 am  Opening by SDB President Alejandro Sánchez Alvarado (Stowers Institute for Medical Research)
11:30 am  Nicole King (University of California, Berkeley) Choanoflagellates and the origin of animal morphogenesis
11:55 am  Lakshminarayan Mahadevan (Harvard University) Dynamic morphoskeletons and morphogenesis
12:20 pm  Jean-Phillipe Vielle Calzada (CINVESTAV, Mexico) Apomixis: epigenetic control of clonal seed formation in flowering plants
12:45 pm  Valentina Greco (Yale University) Skin-resident immune cells actively coordinate their distribution with epithelial stem cells during homeostasis
1:10 pm  Manu Prakash (Stanford University) Life in flatland: Emergent mechanics and origins of behavior in simple non-neuronal systems
1:35 pm  Break

Special Interest Symposium – Confronting Bias in Scientific Culture
Co-Chairs: Nicole Theodosiou (Union College) and Graciela Unguez (New Mexico State University)
2:00 pm  Introduction by Nicole Theodosiou and Graciela Unguez
2:05 pm  Mary Alice Scott (New Mexico State University) Breaking the Culture Bias in Science
2:30 pm  Scott Gilbert (Swarthmore College) A Carrier Bag Theory of Non-Fiction: Removing COWDUNG and Prick Tales from our Biological Narratives
2:55 pm  Discussion
3:30 pm  Break
Concurrent 1 – *Pattern Formation Across Scales*  
Sponsored by Indigo Scientific Limited  
**Co-Chairs:** Mary Wallingford (Tufts Medical Center) and Stephanie Woo (University of California, Merced)

4:00 pm  
**4 Jessica Feldman** (Stanford University) *Patterning the microtubule cytoskeleton during development*

4:20 pm  
**5 Irina Matos** (The Rockefeller University) *How to build a necessary wall: progenitors apically polarize WNT inhibitors to orchestrate tissue development*

4:40 pm  
**6 Tony Tsai** (Harvard Medical School) *An adhesion code ensures robust pattern formation during tissue morphogenesis*

5:00 pm  
**7 Martyna Lukoseviciute** (University of Oxford, UK) *Making heads or tails of an embryo: differential foxd3 regulation in the cranial neural crest and tailbud neuromesodermal progenitors*

5:20 pm  
**8 Peter Whitney** (New York University) *Reading a gradient twice: the cis regulatory logic of a multi-enhancer system*

5:40 pm  
**9 Rashmi Priya** (Max Planck Institute for Heart and Lung Research, Germany) *Tension heterogeneity instructs morphogenesis and fate specification during heart development*

6:00 pm  
**Break**

Concurrent 2 – *On the Razor’s Edge: Cutting-Edge Tools for Developmental Biology*

**Co-Chairs:** Otger Campàs (University of California, Santa Barbara) and Krissie Téllez (SDB Trainee Rep, Stanford University)

4:00 pm  
**Jared Toettcher** (Princeton University) *Optogenetics for perturbing and replacing developmental signaling patterns*

4:20 pm  
**Ariel Bazzini** (Stowers Institute for Medical Research) *CRISPR-Cas13d Induces Efficient mRNA Knock-down in Embryos*

4:40 pm  
**10 Christopher Lowe** (Stanford University) *Hemichordate anteroposterior patterning in contrasting life history strategies*

5:00 pm  
**11 Joaquin Letelier** (Universidad Mayor, Chile; CSIC/UPO/JA, Spain) *Medaka gli3 mutants reveal deep conservation of fin/limb developmental programs*

5:20 pm  
**Stephanie Höhn** (University of Cambridge, UK) *Morphogenesis is stressful – Elastic properties of folding cell sheets*

5:40 pm  
**TBD**

6:00 pm  
**Break**

Concurrent 3 – *Unresolved Developmental Mechanisms*

**Co-Chairs:** Jonah Cool (Chan Zuckerberg Initiative) and Alejandro Sánchez Alvarado (Stowers Institute for Medical Research)

4:00 pm  
**13 Wenchao Qian** (University of Pennsylvania) *A Spatial Gradient of Cell Size Regulates Genome Activation and Vertebrate Early Development*

4:20 pm  
**14 Heather Bruce** (Marine Biological Lab) *Insect wings and body wall evolved from ancient leg segments*

4:40 pm  
**15 Tim Fulton** (University of Cambridge, UK) *Axis specification in zebrafish is robust to cell division*
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<thead>
<tr>
<th>Time</th>
<th>Speaker and Affiliation</th>
<th>Title</th>
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<tbody>
<tr>
<td>5:00 pm</td>
<td>Jessica Stock (IMP)</td>
<td>A self-generated Toddler gradient directs mesodermal cell migration during zebrafish gastrulation</td>
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<tr>
<td>5:20 pm</td>
<td>Shuangshuang Du (Yale)</td>
<td>Cellular and structural orchestrations that sustain skin regeneration captured by live imaging</td>
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<tr>
<td>5:40 pm</td>
<td>Itzel Sifuentes-Romero</td>
<td>Repeated evolution of eye loss in Astyanax mexicanus</td>
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**Concurrent 4 – Regeneration: Bridging the Gap**

**Co-Chairs:** Katia Del Rio-Tsonis (Miami University) and Jorge Cantú (Northeastern Illinois University)

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<th>Time</th>
<th>Speaker and Affiliation</th>
<th>Title</th>
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<tbody>
<tr>
<td>4:00 pm</td>
<td>Andrew Gillis (Cambridge)</td>
<td>Adult chondrogenesis and spontaneous cartilage repair in the skate, Leucoraja erinacea</td>
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<tr>
<td>4:20 pm</td>
<td>Blair Benham-Pyle (Stowers Institute)</td>
<td>Rare and transient somatic cell states are induced by injury and required for whole-body regeneration</td>
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<tr>
<td>4:40 pm</td>
<td>Olena Zhuly (Stanford)</td>
<td>Rapid remodeling of the translatome underlies wound closure and regeneration</td>
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<tr>
<td>5:00 pm</td>
<td>Jack Cazet (Davis)</td>
<td>Injuries induce an oral-specifying Wnt signaling cascade in Hydra</td>
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<tr>
<td>5:20 pm</td>
<td>Andrew Gehrke (Harvard)</td>
<td>The 3D regulatory landscape of whole-body regeneration</td>
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<tr>
<td>5:40 pm</td>
<td>Francesca Mariani (USC)</td>
<td>Shh is expressed early after skeletal injury and is required for large-scale bone regeneration</td>
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6:00 pm Break

6:30 pm - SDB Town Hall Meeting
7:00 pm SDB President Alejandro Sánchez Alvarado reports to membership and takes questions.

**FRIDAY JULY 10**

10-11 am Theme Tables

**Plenary I – Visualizing the Agents of Developmental Processes** Sponsored by Developmental Biology

**Co-Chairs:** Crystal Rogers (University of California, Davis) and Misty Riddle (Harvard University)

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<tr>
<th>Time</th>
<th>Speaker and Affiliation</th>
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<tbody>
<tr>
<td>11:30 am</td>
<td>Neha Kamat (Northwestern)</td>
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<td>11:55 am</td>
<td>Andrew York (Calico)</td>
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<tr>
<td>12:20 pm</td>
<td>Stefano Di Talia (Duke University)</td>
<td>Waves and flows: physical principles of organization of embryogenesis and regeneration</td>
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<tr>
<td>12:55 pm</td>
<td>Guillermina Ramirez-San Juan (Stanford)</td>
<td>Multiscale spatial heterogeneity enhances particle clearance in airway ciliary arrays</td>
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<tr>
<td>1:10 pm</td>
<td>Break</td>
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**Hilde Mangold Postdoctoral Symposium**  
Sponsored by *Developmental Dynamics*

**Co-Chairs:** Marina Venero Galanternik (National Institutes of Health) and Christopher Arnold (Stowers Institute for Medical Research)

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<tr>
<th>Time</th>
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<tr>
<td>1:30 pm</td>
<td>Katie Cockburn (Yale University)</td>
<td><strong>Co-occurring differentiation and proliferation behaviors define epidermal regeneration</strong></td>
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<tr>
<td>1:45 pm</td>
<td>Wouter Masselink (Research Institute of Molecular Pathology (IMP), Austria)</td>
<td>A unique population of Asomitic Mesodermal cells controls axolotl tail regeneration</td>
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<tr>
<td>2:00 pm</td>
<td>Granton Jindal (University of California, San Diego)</td>
<td>A single base pair change dramatically alters binding site affinity and enhancer activity</td>
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<tr>
<td>2:15 pm</td>
<td>Justin Varholick (University of Florida)</td>
<td>A first look into whether psychological stress delays regeneration in spiny mice (Acomys cahirinus)</td>
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<td>2:30 pm</td>
<td>Zak Swartz (Whitehead Institute for Biomedical Research)</td>
<td>Polarized dissolution and condensation of Dishevelled in oocytes drives embryonic axis specification</td>
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<tr>
<td>2:45 pm</td>
<td>Lauren Walker (University of Pennsylvania)</td>
<td>Identification of extrinsic cues promoting target-selective axon regeneration</td>
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<td>3:00 pm</td>
<td>Karolina Mizeracka (Boston Children's Hospital)</td>
<td>Different paths to the same cell type</td>
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<td>3:15 pm</td>
<td>Mary Regier (University of Washington)</td>
<td>Singe-Cell Spatial Transcriptomics at Embryo-Scale</td>
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<td>3:30 pm</td>
<td>Break</td>
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**Concurrent 5 - Cells on the Move**  
Sponsored by Northwestern University

**Co-Chairs:** Tatjana Piotrowski and Nicolas Denans (Stowers Institute for Medical Research)

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<tr>
<th>Time</th>
<th>Speaker</th>
<th>Title</th>
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<tbody>
<tr>
<td>4:00 pm</td>
<td>Lillian Fritz-Laylin (University of Massachusetts Amherst)</td>
<td>Chytrid fungi and our evolving view of cell motility</td>
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<tr>
<td>4:20 pm</td>
<td>Minna Roh-Johnson (University of Utah)</td>
<td>Cell-matrix interactions during cell migration in vivo</td>
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<td>4:40 pm</td>
<td>Thomas Schilling (University of California, Irvine)</td>
<td>Regulation of cell adhesion dynamics coordinates migration and fate decisions in the neural crest</td>
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<td>5:00 pm</td>
<td>Bomsoo Cho (Stanford School of Medicine)</td>
<td>Prickle isoforms determine handedness of helical morphogenesis</td>
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<tr>
<td>5:20 pm</td>
<td>Subramanian Ramanathan (Stowers Institute for Medical Research)</td>
<td>Cell-size differential drives aberrant clone dispersal in epithelial tissue</td>
</tr>
<tr>
<td>5:40 pm</td>
<td>Shinuo Weng (University of Texas at Austin)</td>
<td>Cell crawling and junction contraction: “Frenemies” in convergent extension</td>
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<tr>
<td>6:00 pm</td>
<td>Break</td>
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**Concurrent 6 - Organoids: A Window to Developmental Processes**  
Sponsored by Northwestern University

**Co-Chairs:** Olivier Pourquié (Harvard University) and Heather Ray (University of Alabama, Birmingham)

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<tr>
<th>Time</th>
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<th>Title</th>
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<tbody>
<tr>
<td>4:00 pm</td>
<td>Adriana Harbuzariu (Morehouse School of Medicine)</td>
<td>Development of an ex vivo human brain organoid model to study severe malaria-associated brain injury</td>
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<tr>
<td>4:20 pm</td>
<td>Sarah Saxton (University of Washington)</td>
<td>Hepatoblast organoids have bipotential fate in engineered liver tissue</td>
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<tr>
<td>4:40 pm</td>
<td>Mirna Marinic (University of Chicago)</td>
<td>Towards a complex in vitro model of human</td>
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Yuji Atsuta (Kyushu University, Japan; Harvard) Making vertebrate limbs from non-limb fibroblasts

Sarah Hadyniak (Johns Hopkins University) Temporal regulation of green and red cone photoreceptor specification in human retinas and retinal organoids

Angie Serrano (University of Utah) Cellular and molecular mechanisms of Kabuki Syndrome neurodevelopmental defects in zebrafish and human iPSC-derived brain organoids

Concurrent 7 – Developmental Biology and Global Health

Co-Chairs: Caralina de Marin Evsikova (University of South Florida) and Warren Vieira (University of Massachusetts, Boston)

Priya S. Shah (University of California, Davis) Unraveling the similarities between hereditary and viral microcephaly

Emmitt Jolly (Case Western University) Heads or tails: A parasitic tale of two developmental outcomes

Jayhun Lee (Morgridge Institute for Research) The esophageal gland-mediated host immune evasion by blood fluke Schistosoma mansoni

Jennifer Watts (Michigan State University) The effects of sexually-transmitted ZIKV infection on preimplantation development

Maria Mikedis (Whitehead Institute) A broad translational program regulates the progenitor population during spermatogenesis

Anita Quintana (University of Texas El Paso) Molecular mechanisms modulating neural development in cblX syndrome

Concurrent 8 – Finding a Partner: Evolution, the Immune System and the Origins of Symbiosis

Co-Chairs: Virginia Weis (Oregon State University) and Delbert Green II (University of Michigan)

Annika Guse (Heidelberg University, Germany) Dinoflagellate symbionts escape vomocytosis by host cell immune suppression

Jodie Schiffer (Northeastern University) Caenorhabditis elegans processes sensory information to choose between freeloading and self-defense strategies

Minjie Hu (Carnegie Institution for Science) Lineage dynamics of the endosymbiotic cell type in a soft coral Xenia

Raymond Allen (Duke University) The roles of Macrophage Migratory Inhibitory Factors (MIFs) in sea urchin development

Rujuta Deshpande (University of Calgary, Canada) The role of intestinal TOR signaling in metabolic responses to bacterial infection

Joseph Parker (California Institute of Technology) Cell type evolution and biosynthetic innovation in animals

Break
6:30-7:30 Theme Tables

SATURDAY JULY 11
10-11 am Theme Tables

Plenary II - Genotype, Phenotype & Evolution
Sponsored by Developmental Biology

Co-Chairs: Mary Dickinson (Baylor College of Medicine) and Malcolm Moses (MD Anderson Cancer Center)

11:30 am 56 Wallace Marshall (University of California, San Francisco) Pattern formation and regeneration in a single cell

11:55 am 57 Natalia Pabon Mora (Universidad de Antioquia, Colombia) Evolutionary shifts in the genetic regulatory network controlling fruit development across eudicots

12:20 pm 58 Ehab Abouheif (McGill University, Canada) Of Ants and Embryos: Pathways to Major Evolutionary Transitions

12:55 pm 59 Kimberly Cooper (University of California, San Diego) How (and why) the jerboa got its long legs

1:10 pm Break

Workshop – Strategies to Lessen Biases in Science

Chair: Crystal Rogers (University of California, Davis) Moderators: Nicole Theodosiou (Union College) and Graciela Unguez (New Mexico State University)

1:30-3:30 pm Panel and Discussion
Panelists: Carmen Domingo (San Francisco State University); Barbara Lom (Davidson College)

Concurrent 9 - Climate Change and Adaptation: Open Problem for Developmental Biologists

Co-Chairs: Manu Prakash (Stanford University) and Anita Quintana (University of Texas, El Paso)

4:00 pm 60 Leslie Ries (Georgetown University) A novel framework for understanding and projecting insect responses to climate change

4:20 pm 61 Virginia Weis (Oregon State University) Coral symbiosis cell biology in the age of climate crisis: Turning discovery into solutions for saving reefs

4:40 pm 62 Michael Dorrity (University of Washington) Temperature stress introduces variability in embryogenesis via cell type-specific effects on developmental rate

5:00 pm 63 Alberto Stolfi (Georgia Institute of Technology) Development of sensory, secretory, and contractile functions of an organ for settlement and metamorphosis of tunicate larvae

5:20 pm 64 Jacob Daane (Boston Children's Hospital, Harvard University, Northeastern University) From the depths: deep comparative phylogenomics in fishes to identify genetic mechanisms of evolution, development, and disease

5:20 pm 65 Robert Reed (Cornell University) Cis-regulatory architecture of butterfly wing pattern evolution

6:00 pm Break

Concurrent 10 - Seeing is Believing: Imaging Revolution
Co-Chairs: Amy Ralston (Michigan State University) and Maria Jussila (The Hospital for Sick Children, Canada)

4:00 pm  Nicolas Plachta (National University of Singapore, Singapore) - EMBO Jr Investigator
*Imaging the dynamics that form the early mammalian embryo*

4:20 pm  66 Elizabeth Driver (National Institute on Deafness and Other Communication Disorders/NIH)
*Cochlear extension and patterning require Myosin II and E-cadherin,*

4:40 pm  67 Marissa Gredler (Sloan Kettering Institute/HHMI) *Dynamic cell behaviors drive axial mesoderm morphogenesis*

5:00 pm  68 Leslie Mateo (Stanford University) *Super-resolution imaging of 3D DNA folding and RNA transcription during Drosophila development*

5:20 pm  69 Akankshi Munjal (Harvard Medical School) *Hyaluronan-hydraulics and contractile-cytocinches drive inner ear morphogenesis*

5:20 pm  70 Elizabeth Urban (Johns Hopkins University) *Determining how noisy transcription controls stochastic fate specification in the developing fly eye*

6:00 pm  Break

Concurrent 11 - The Biology of Aging

Co-Chairs: Naiche Adler (University Illinois, Chicago) and Chi-Kuo Hu (Stanford University)

4:00 pm  71 Guo Huang (University of California San Francisco) *Molecular control of organ regeneration: Insights from platypus, armadillos, bats and whales*

4:20 pm  72 Maximina Yun (TU Dresden, Germany) *Telomere length is exclusively maintained by the ALT mechanism in a regeneration-competent vertebrate, the newt Pleurodeles waltl*

4:40 pm  73 Peter Kropp (NIDDK/National Institutes of Health) *Pleiotropic effects of mitochondrial dysfunction: A characterization of Multiple Mitochondrial Dysfunctions Syndrome 1*

5:00 pm  74 John Quinn (Arizona State University) *Regulation of Damage-Responsive Maturity-Silenced enhancers in Drosophila*

5:20 pm  75 Emily Heckman (University of Oregon) *Molecular mechanisms that enable synapse stabilization and restoration*

5:20 pm  TBD

6:00 pm  Break

Concurrent 12 - Endless Forms Most Beautiful: Role of Biodiversity in Developmental Biology

Co-Chairs: Joaquín Navajas Acedo (Biozentrum, University of Basel, Switzerland) and Ondine Cleaver (University of Texas Southwestern Medical Center)

4:00 pm  76 Ricardo Mallarino (Princeton University) *How to build a gliding mammal: patterning mechanisms in mammalian skin*

4:20 pm  77 Caroline Albertin (Marine Biological Laboratory) *HOX genes and the cephalopod body plan*

4:40 pm  529 Yao-Wu Yuan (University of Connecticut) Development and evolution of self-organizing pigmentation patterns in monkeyflowers

5:00 pm  78 Wei Wang (Stowers Institute for Medical Research) *Regeneration enhancers and the uneven distribution of regenerative capacities in vertebrates*

5:20 pm  79 Elena Boer (University of Utah) – Best 2019 Developmental Biology trainee author. *From
head to toe: uncovering mechanisms of craniofacial and limb variation in domestic pigeons

5:40 pm  **80** Ahmet Karabulut (Stowers Institute for Medical Research) *Architecture and explosive discharge of a cellular weapon*

6:00 pm Break

6:30-7:30 **Theme Tables**

SUNDAY JULY 12

11 am – **Brunch with SDB Board of Directors**

12:30 pm

**Awards Lectures**

1:00 pm Introduction

1:05 pm **Brigid Hogan** (Duke University) – FASEB Excellence in Science Award. *Reflections on a career in developmental biology: What I wish I had known when I was younger*

1:40 pm **Cagney Coomer** (University of Kentucky) – SDB Trainee Science Communication Award. *Nerd squad. The movement.*

2:00 pm  **81** Celina Juliano (University of California-Davis) – Elizabeth D. Hay New Investigator Award. *Mechanisms of Development andRegeneration in Hydra*

2:35 pm Break

3:00 pm **Jo Handelsman** (University of Wisconsin) – Viktor Hamburger Outstanding Educator Prize. *Tiny Earth: Studentsourcing Antibiotic Discovery*

3:35 pm **Ray Keller** (University of Virginia) – *Developmental Biology*-SDB Lifetime Achievement Award. *50 Years of Adventures with Friends in Morphogenesis*

4:10 pm **Claude Desplan** (New York University) – Edwin G. Conklin Award. *The generation of neural diversity*

4:45 pm *End of Platform Sessions*

MONDAY JULY 13

**Poster Presentations** (Program Numbers are in **bold italics**. Presentation Numbers are in **bold**.)

**Live Q&A Poster Session 1**

11:00 am **Group A** (Themes: Cell Adhesion, Migration and Guidance; Cell Fate Specification and Differentiation; Cell Growth and Polarity; Computation and Modeling of Cell and Tissue Behavior)

**82 A1** *TMED2 is Required for Trophoblast Migration, Differentiation, and Proliferation* **Rachel Aber**, Caroline Kaiser, Libin Yuan, Loydie Jerome-Majewska (McGill University, CA)

**83 A2** *Characterization of the spatiotemporal expression pattern of Dispatched-3 during chick cranial neural crest development* **Amina Hussein**, Julaine Roffers-Agarwal, Laura S. Gammill (University of Minnesota-Twin Cities, USA)

**84 A3** *Characterizing Meteorin as a midline signaling molecule that determines radial glial cell fates during zebrafish CNS development* **Madeline Ryan**, Narendra Pathak, Raegan Stokes, Kylee White-
A4 Embryonic exposure to ibuprofen causes neural crest defects in vertebrate embryos **Nikolas Morrison-Welch**, Sasha Machulsky, Dr. Crystal Rogers (California State University, Northridge, USA; University of California Davis, USA)

A5 Uncovering functional roles in development for differentially expressed ribosomal protein eRpl22-like using a conditional gene knockout strategy **Caroline Pritchard** (Lehigh University, USA)

A6 Tubes, Coils, or Branches? Developing Novel Ways to Characterize Uterine Glands **Sameed Khan**, Jayani Balaji, Adam Alessio, Ripla Arora (Institute for Quantitative Health Science and Engineering, Michigan State University, USA; Department of Obstetrics, Gynecology, and Reproductive Biology, Michigan State University, USA; Department of Computational Mathematics, Science, and Engineering, Michigan State University, USA; Department of Biomedical Engineering, Michigan State University, USA)

11:30 pm **Group B** (Themes: Genetic Models of Disease; Germ Cells and Gametogenesis)

B1 Elucidation of Pax2 ocular phenotypes beyond coloboma **Julissa Suarez-Navarro**, Bernadett Bösze Bösze, Abdul Soofi, Greg Dressler, Nadean L. Brown (University of California Davis, USA; Dept of Pathology, University of Michigan, USA)

B2 Analysis of mutations in distinct domains of kmt2d: genotype-phenotype correlations in Kabuki Syndrome zebrafish. **Calleen Housden**, Angie Serrano, Bradley Demarest, H. Joseph Yost (Dept of Neurobiology and Anatomy, University of Utah School of Medicine, Salt Lake City, Utah, USA; Dept of Pediatrics, School of Medicine, Salt Lake City, Utah, USA)

B3 Investigating the Roles of Asteroid and Star during Oocyte Selection and Oogenesis in Drosophila **Corinne Croslyn**, Julie Merkle (University of Evansville, USA)

B4 Investigating Role of the COPII Vesicle Trafficking during Oocyte Determination in Drosophila melanogaster **Gregory Maas**, Julie Merkle (University of Evansville, USA)

B5 Characterization of CG4511 as a Novel Regulator of Spermatogenesis **Claire Chaikin** (Loyola University Chicago, USA)

B6 Tracing the Migration Pattern of Primordial Germ Cells (PGCs) in Developing Monodephis domestica Embryos **Yue Yu**, Yolanda Cruz (Oberlin College, USA)

12:00 pm **Group C** (Themes: Genome Editing; Neural Development and Patterning; Organogenesis; Patterning Embryo Development; Stem Cells and Tissue Regeneration)

C1 The Identification of Maternal-Effect Genes in Zebrafish by a Maternal Crispant Screen **Gabriella Voit**, Cara Moravec, Jarred Otterlee, Francisco Pelegri (University of Wisconsin Madison, USA)

C2 A novel zebrafish mutant, stl159, exhibits defects in sensory axon and glial patterning **Lauren Limbach**, Afomia Ayele, Kristen Pitts, Elisabeth Bradford, Sarah Petersen (Kenyon College, USA)

C3 Fipronil affects the Cardiovascular System in Zebrafish (Danio rerio) **Zoe Krut**, Kasey Cooper, Benjamin Walker, Alexander Kramer, Jonathan Morgan, Christopher Lassiter (Roanoke College, USA)

C4 Iroquois genes may play an important role in pharyngeal development **Kelsey Donahue** (Northern Kentucky University, USA)

C5 Effects of tail amputation on the regeneration of electric fish species with myogenic and electrogenic organs under varied environmental conditions **Samantha Bowden**, Anita Singh, Graciela Unguez (New Mexico State University, USA)

C6 Loss of jaq2b leads to adult-onset hypertrophic cardiomyopathy in zebrafish **Avery Abelhouzen**, H. Joseph Yost, Chelsea Herdman, Luke E. Sanders, Bradley L. Demarest (Molecular Medicine Program, University of Utah, United States; Department of Neurobiology & Anatomy, School of Medicine, University of Utah, United States; Department of Pediatrics, School of Medicine, University of Utah, United States)
Live Q&A Poster Session 2

11:00 am  **Group A** (Themes: Education; Gene Regulation and Chromosome Topology; Mechanical Influences of Cell and Tissue Development)

88 A1  *Community-Building Strategies Toward Improving Science Literacy in Secondary Education and Beyond*  
Brigitte L. Arduini¹, Raman Brar², Annie Chien³, Mark Girona³, Jesusa Meriokes⁴, Deanna M. Thompson¹ (¹Rensselaer Polytechnic Institute, USA; ²Schenectady City School District, USA; ³Saratoga Springs City School District, USA; ⁴Bronx, New York City Department of Education, USA)

89 A2  *Doing the Molecular Splits: Hands-on Demonstration Tips to Help Student Engagement Using Split Inteins in Molecular Biology*  
Robert Kao (Heritage University, USA)

90 A3  *The Genomics Education Partnership: A Nationwide CURE that Enhances Research Opportunities for Students and Faculty at Diverse Institutions*  
Judy Leatherman¹, David Lopatto², Wilson Leung³, Laura K. Reed⁴, The GEP Faculty Community⁵ (¹University of Northern Colorado, United States; ²Grinnell College, United States; ³Washington University in St. Louis, United States; ⁴University of Alabama, United States; ⁵http://gep.wustl.edu, United States)

91 A4  *Novel role of transcription factor NF-Y in Regulation of Cilia genes during Zebrafish Development*  
Jessica Warns¹, William Stanney III², Ian Donaldson², Nicoletta Bobola³, Yong-Il Kim¹, Charles Sagerström Sagerström¹² (¹University of Colorado Anschutz, USA; ²University of Massachusetts Medical School, USA; ³University of Manchester, UK)

92 A5  *Mechanical regulation of ephrin/Eph signaling in the developing Xenopus brain*  
Jana Sipkova, Kristian Franze (Department of Physiology, Development and Neuroscience, University of Cambridge, GB)

93 A6  *Effects of Physical Perturbations on Calcium Activity in Developing Embryos*  
Michelle Yue, Rithvik Nalamalapu, Sudip Paudel, Margaret Saha (College of William and Mary, USA)

11:30 am  **Group B** (Theme: Mechanical Influences of Cell and Tissue Development)

112 B1  *Physical Basis for Epithelial Cell Reintegration*  
Christian Cammarota¹, Nicole Dawney², Muskaan Vasandani², Dan Bergstrah1,² (¹University of Rochester, Department of Physics and Astronomy, USA; ²University of Rochester, Department of Biology, USA)

113 B2  *Mechanical and signaling mechanisms that guide pre-implantation embryo movement*  
Diana Flores Diaz¹,³, Manoj Madhavan¹,³, Savannah Wright³, Ripa Arora¹,³,² (¹Department of Obstetrics, Gynecology and Reproductive Biology, Michigan State University, USA; ²Department of Biomedical Engineering, Michigan State University, USA; ³Institute for Quantitative Health Science and Engineering, Michigan State University, USA)

114 B3  *Mechanical bistability during Drosophila mesoderm invagination*  
Hanqing Guo¹, Michael Swan², Bing He¹ (¹Dartmouth College, United States; ²Princeton University, United States)

115 B4  *Zebrafish basal epidermal cells require Yap and Taz to survive*  
Jason Kuan Han Lai¹, Pearlyn Toh¹, Didier Stainier², Timothy Saunders¹ (¹Mechanobiology Institute Singapore, Singapore; ²Max Planck Institute for Heart and Lung Research, Germany)

116 B5  *Injury and recovery of plasma membrane during cell invasion in vivo*  
Kieop Park (Duke University, USA)

117 B6  *Mechanical force regulates the balance of scx and sox9 expression at the cartilage-tendon attachment interface during development.*  
Arul Subramanian¹, Lauren Kanzaki², Thomas Schilling² (¹University of California - Irvine, USA; ²The Ohio State University, USA)

12:00 pm  **Group C** (Theme: Germ Cells and Gametogenesis)

136 C1  *A Tale of Two CENP-C’s: Dynamic and Stable Populations of CENP-C in Oocyte Meiosis are Both Required for Accurate Chromosome Segregation*  
Jessica Fellmeth, Hannah Sturm, Neha Changela, Kim McKim (Waksman Institute of Microbiology - Rutgers The State University of NJ, USA)
Characterizing HECD-1/Hect-family ubiquitin ligase during oocyte formation in C. elegans. Tammy Lu, Hanifa Soueid, Ryan Smit, Paul Mains (University of Calgary, CA)

A Novel Role for the Chromosomal Passenger Complex in Germ Plasm Aggregation During Early Development Cara Moravec, Francisco Pelegri (University of Wisconsin – Madison, USA)

Quiescence in primordial germ cells Nathalie Oulhen, Stephany Foster, Gary Wessel (Brown University, USA)

Germline development is dependent on segment number and not the chronological age in the marine annelid Platynereis dumerilii B. Duygu Ozpolat, Emily Kuehn, Ryan Null (Marine Biological Laboratory, USA)

Heteromeric Kinesin II is required for flagellar assembly and elongation of nuclear morphology during spermiogenesis of Schmidtea mediterranea Labib Rouhana, Donovan Christman (Wright State University, USA)

Live Q&A Poster Session 3

11:00 am  Group A (Themes: Functional Genomics; Genome Editing)

Analysis of transcriptome changes in zebrafish ZGA mutants using RNA-sense tool Meijiang Gao1,3, Marina Veil1, Marcus Rosenblatt2, Helge Hass2, Jens Timmer2, Daria Onichtchouk1,3 (1Developmental Biology, Institute Biology I, Faculty of Biology, Albert Ludwigs University of Freiburg, 79104 Freiburg, Germany; 2Institute of Physics Faculty of Mathematics and Physics Freiburg, Germany; 3Signalling Research centers BIOSS and CIBSS, 79104, Freiburg, Germany)

Comparative transcriptomics of non-model colonial hydrozoans: understanding the signaling toolkit involved in the body plan diversification Daria Kupaeva1, Stanislav Kremnyov1,2 (1Laboratory of Morphogenesis Evolution, Koltzov Institute of Developmental biology RAS, Russia; 2Department of Embryology, Faculty of Biology, Lomonosov Moscow State University, Russia)

Effects of Polyploidy in C. elegans Mara Schvarzstein1, Gunar Fabig2, Katharina Kupsch2, Tara Vanvarong1, Brandon Ely1, Thomas Mueller-Reichert2 (1City University of New York, CUNY, USA; 2Experimental Center, Medical Faculty Carl Gustav Carus, Technische Universität Dresden., Germany)

Sloth1/2 are two small peptides encoded from a single transcript that regulate mitochondrial function in Drosophila Justin Bosch1, Berrak Ugur2,5, Israel Pichardo-Casas1, Jorden Rabasco1, Felipe Escobedo1, Zhongyuan Zuo2, Ben Brown3, Susan Celniker3, David Sinclair1, Hugo Bellen5, Norbert Perrimon1,4 (1Department of Genetics, Blavatnick Institute, Harvard Medical School, Boston, MA, USA; 2Department of Molecular and Human Genetics, BCM, Houston, TX, USA; 3Lawrence Berkeley National Laboratory, Berkeley, CA, USA; 4Howard Hughes Medical Institute, USA; 5Departments of Neuroscience and Cell Biology, Howard Hughes Medical Institute, Yale University School of Medicine, New Haven, Connecticut, USA)

An Enzymatic Method for Creating CRISPR sgRNA Libraries Jonathon Hill, Joshua D Yates, Carson Russell, Nathaniel Barton, Idongesit Ekpo (Brigham Young University, USA)

CRISPR-Cas13d induces efficient mRNA knock-down in animal embryos Gopal Kushawah1, Luis Hernandez-Huertas2,3, Joaquin Abugattas-Nuñez del Prado2,3,4, Juan R. Martinez-Morales2, Alejandro Sánchez Alvarado1,6, Michelle DeVore1, Carter M. Takacs5, Miguel A. Moreno-Mateos2,3, Ariel A. Bazzini1 (1Stowers Institute for Medical Research, USA; 2Andalusian Center for Developmental Biology (CABD), Spain; 3Department of Molecular Biology and Biochemical Engineer, Spain; 4Department of Biology, Universidad Peruana Cayetano Heredia, peru; 5Department of Biology and Environmental Science, University of New Haven, USA; 6Howard Hughes Medical Institute, Stowers Institute for Medical Research, Kansas, MO, USA, USA; 7Department of Molecular and Integrative Physiology, University of Kansas Medical Center, USA)

11:30 am  Group B (Theme: Organogenesis)
118 B1 To branch ER not to branch: Uterine gland branching phenotypes in Estrogen Receptor knockout mice Sarah David1,2,3, Ripla Arora1,2,3 (1Michigan State University, USA; 2Institute for Quantitative Health Science and Engineering, USA; 3Department of Obstetrics, Gynecology and Reproductive Biology, USA)

119 B2 Developmental lymphangiogenesis requires regulation of the transcription factor NFATC1 Alexandra Fister1,2, Hyun Min Jung1,2, Andrew Davis1,2, Daniel Castranova1,2, Van Pham1,2, Brant Weinstein1,2 (1National Institutes of Health, United States; 2Eunice Kennedy Shriver National Institute of Child Health and Human Development, United States)

120 B3 Renal stromal netrin-1 signaling drives kidney arterial development Xiaowu Gu, Yadanan Htike, Ondine Cleaver (UT Southwestern Medical Center, USA)

121 B4 DRP1-Mediated Mitochondrial Fission is Essential for Mouse Cardiogenesis Kai Jiao1, Qiancong Zhao1,2, Shun Yan1,2, Parker Danitra1, Huiying Wu1,2, David Crossman1, Qin Wang1,2, Kasturi Mitra1, Kexiang Liu (1University of Alabama At Birmingham, USA; 2Jilin University, P. R. China)

122 B5 Characterizing the role of RHOA signaling in regulating vascular integrity and development Laura Pillay, Joseph Yano, Andrew Davis, Keith Barnes, Matthew Butler, Vanessa Reyes, Daniel Castranova, Amber Stratman, Gennady Margolin, Aniket Gore, Matthew Swift, James Iben, Brant Weinstein (NIH, USA)

123 B6 Proteomics analysis to define stage-specific molecular networks regulating vascular development at the placental maternal-fetal interface Olga Kashpur1, Ariel Mei1, Shiori Kuraoka2, Hideyuki Higashi2, Sasha Singh2, Elena Aikawa2, Mary Wallingford1 (1Tufts Medical Center, USA; 2Brigham and Women's Hospital, USA)

12:00 pm Group C (Theme: Organogenesis)

142 C1 Maternal exposure to tobacco products leads to skeletal deformities in offspring mice persisting into adulthood Ruthia Soh, Lauren Walker, Nicole Sparks, Nicole zur Nieden (University of California Riverside, United States)

143 C2 The dynamic life of the thyroid gland: Environmental cues regulating development and function of the thyroid follicular cells. Sumeet Singh, Pierre Gillotay, Macarena Pozo Morales, Meghna Shankar, Sema Elif Eski, Ines Garteizgogaeuscoa, Sabine Costagliola (IRIBHM, ULB, BE)

144 C3 Investigating the role of nicotinamide adenine dinucleotide synthesis in early Xenopus laevis organogenesis Andrew Bell1,2,3,4, Victoria M Siu3,4, Thomas A Drysdale1,2,3,4 (1Department of Physiology and Pharmacology, The University of Western Ontario, CA; 2Department of Developmental Biology, The University of Western Ontario, CA; 3Children’s Health Research Institute, Lawson Health Research Institute, CA; 4Department of Paediatrics, The University of Western Ontario, CA)

145 C4 Differential requirement of hand1 in the development of specific LPM lineages in Xenopus Laevis Thomas Drysdale1,2, Victoria Deveau1,2 (1Dept. of Physiology & Pharmacology, Dept. of Paediatrics, Univ of Western Ontario, London, ON, CA; 2Children’s Health Research Institute, London, ON, CA)

146 C5 From Wigglesworth to present: The role of branchless and their receptor during the tracheal system remodeling in Rhodnius prolixus Andres Lavore1,2, Guillermima Buzetti (1CONICET, Argentina; 2Univ. Nacional del Noroeste de Buenos Aires, Argentina)

147 C6 The PAR polarity complex promotes apical remodeling during intestinal development. Maria Sallee, Melissa Pickett, Jessica Feldman (Stanford University, USA)

12:30 pm Break

Live Q&A Poster Session 4

11:00 am Group A (Theme: Development and Evolution)

100 A1 Evolution of the Amphipod Crustacean Body Plan: from End to End Jennifer McCarthy1, Courtney Babbitt2, Nipam H. Patel1,4 (1UC Berkeley, USA; 2University of Massachusetts Amherst, USA; 3Marine
The Two Body Problem: An investigation of development in adult and larval body plans of the indirect developing hemichordate Schizocardium californicum. Paul Bump¹, Margarita Khariton², Clover Stubbert³, Bo Wang², Dan Rokhsar⁴, Christopher Lowe¹ (¹Hopkins Marine Station of Stanford University, USA; ²Stanford University, USA; ³California State University, Monterey Bay, USA; ⁴University of California, Berkeley, USA)

Morphogenetic basis for tetramerous symmetry in scyphozoan polyps Igor A. Kosevich (Faculty of Biology, Lomonosov Moscow State University, Russian Federation)

cWnt signaling is essential for the colony-level patterning in thecate hydrozoans Stanislav Kremnyov¹,², Daria Kupaeva¹, Alexandra Vetrova², Tatiana Bagaea³ (¹Lomonosov Moscow State University, Moscow; ²Koltzov Institute of Developmental Biology RAS, Moscow; ³University of Vienna, Austria)

The Global Obesity Epidemic - Are You What Your Mother Ate?: Environment Shapes Adult Phenotype Caralina Marin de Evsikova, Esperanza A. Evsikova, Alexei Evsikov (University of South Florida, USA)

Exploring the role of Blood Cells (Hemocytes) during Drosophila metamorphosis Sushmit Ghosh, Saikat Ghosh, Lolitika Mandal (Indian Institute of Science Education and Research, Mohali, India)

Evolution of the small molecule transport system in animal development Katherine Nesbit¹, Kathy P. Le¹, Adam Reitzel², Jake Warner³, Deirdre Lyons¹, Amro Hamdoun¹ (¹University of California San Diego, USA; ²University of North Carolina Charlotte, USA; ³University of North Carolina Wilmington, USA)

Using Nature’s experiments to uncover insights into genetic regulation of form Katherine Woronowicz¹,², Jacob Daane³, Evgeny Eskin³, Fedor Shkil⁴, Matthew Harris¹,² (¹Boston Children’s Hospital, USA; ²Harvard University, USA; ³Northeastern University, USA; ⁴Severtsov Institute of Ecology and Evolution and Koltzov Institute of Developmental Biology, Russian Academy of Sciences, Russia)

Dissecting plantlet development in K. marnieriana Bharti Parihar (California State University, East Bay, USA)

The larval bivalve shell: an evo-devo approach reveals life-stage specific transcriptional profile and hints at a developmentally conserved biomineralisation “tool-kit” Victoria A. Sleight¹,², Alessandro Cavallo¹, Melody S. Clark¹, Lloyd S. Peck¹, Elizabeth M. Harper³ (³Department of Earth Sciences, University of Cambridge, U.K.)

Early-life hypoxia alters adult physiology and reduces stress resistance and lifespan in Drosophila Danielle Polan¹,²,³, Mohammad Alansari¹,²,³, Byoungchun Lee¹,²,³, Savraj Grewal¹,²,³,4 (¹Cumming School of Medicine University of Calgary, Canada; ²Clark H. Smith Brain Tumour Centre, Canada; ³Arnie Charbonneau Cancer Institute, Canada; ⁴Alberta Children’s Hospital Research Institute, Canada)

Drosophila as a Model for Understanding Bisphenol A Promotion of Obesity via Lipolytic Reduction Maura Connorton¹, Todd Camenisch², Janet Lighthouse², Edward Freeman¹ (¹St. John Fisher College, USA; ²Wegmans School of Pharmacy, USA)

hox5 genes pattern Weberian vertebrae in zebrafish Samara Williams¹, Claire Watson¹, Adrian Monstad-Rios¹, Cecilia Moens², Ronald Kwon¹ (¹Musculoskeletal Systems Biology Lab, Department of Orthopaedics and Sports Medicine, University of Washington, United States; ²Division of Basic Sciences, Fred Hutchinson Cancer Research Center, United States)

Topologically Associating Domain Boundaries are Commonly Required for Normal Genome Function Sudha Rajderkar¹, Yiwen Zhu¹, Iros Barozzi², Rong Hu³, Bin Li³, Yanxiao Zhang³, Guy Kelman³, Adyam Akeza¹, Anne Harrington¹, Janeth Godoy¹, Eman Meky¹, Catherine Novak¹, Ingrid Plajzer-Frick¹, Veena Afzal¹, Stella Tran¹, Kent Lloyd⁴, Bing Ren², Diane Dickel², Axel Visel¹, Len Pennacchio¹ (¹Lawrence Berkeley National Laboratory, Berkeley CA, USA; ²Imperial College, London, UK; ³Ludwig Institute for Developmental and Evolutionary Biology, University of California, San Diego, USA)
150 C3 Genetic basis of behavioral evolution in the cavefish *Astyanax mexicanus* **Johanna Kowalko**, Morgan O’Gorman, Sunishka Thakur, Alex Keene (Florida Atlantic University, USA)

151 C4 The fish family poeciliidae as a model to study the evolution and diversification of regeneration capacity in vertebrates **Diego Safian**¹,², Bart Pollux² (¹Aquaculture and Fisheries Group, Department of Animal Sciences, Wageningen University, The Netherlands; ²Experimental Zoology Group, Department of Animal Sciences, Wageningen University, The Netherlands)

152 C5 The Role of SHH Signaling in Regulating Species-Specific Jaw Size **Zuzana Vavrušová**¹,², Daniel Chu¹, Jennifer L. Fish¹, Richard A. Schneider¹ (¹UCSF, USA; ²Université Paris-Saclay, France; ³University of Massachusetts Lowell, USA)

153 C6 Characterization of a yeast interfering RNA larvicide with a target site conserved in the Rbfox1 gene of multiple disease vector mosquitoes **Max P. Scheel**¹,², Jessica Igiede¹, Laura Gerber¹, John J. Kosmach¹,², David W. Severson¹,², Keshava Mysore¹,², Molly Duman-Scheel¹,² (¹Indiana University School of Medicine, United States; ²University of Notre Dame, United States)

12:30 pm Break

Live Q&A Poster Session 5

1:00 pm **Group A** (Theme: Neural Development and Patterning)

154 A1 Astrocytes close a critical period of motor circuit plasticity **Sarah Ackerman**¹, Nelson A. Perez-Catalan¹, Marc R. Freeman², Chris Q. Doe¹,³ (¹University of Oregon, USA; ²Oregon Health & Science University, USA; ³Howard Hughes Medical Institute, USA)

155 A2 What guides the leaders: Identifying factors involved in *C. elegans* pioneer axon extension **Abigail Feresten**¹, Jaffar Bhat¹, Alex Yu², Catharine Rankin², Harald Hutter¹ (¹Simon Fraser University, Canada; ²University of British Columbia, Canada)

156 A3 Unique early pioneer neurons in two dinophilid species (Lophotrochozoa: Annelida) neurogenesis **Elizaveta Fofanova**¹, Tatyana Mayorova², Elena Voronezhskaya¹ (¹Koltsov Institute of Developmental Biology RAS, Russian Federation; ²National Institute of Neurological Disorders and Stroke, NIH, Bethesda MD 20892, USA)

157 A4 The evolution of centralization: neural architecture in the sea anemone *Nematostella vectensis* **Ruohan Zhong**, Matthew Gibson (Stowers Institute for Medical Research, United States of America)

158 A5 Exploring the variables defining synaptic partner choice of vomeronasal sensory neurons **Jennifer Lin**, Alison Pehl, Paolo E. Forni (University at Albany, USA)

159 A6 Understanding retinal ganglion cell axon outgrowth using human retinal organoids **Yang Liu**, Brian Guy, Simon Zhang, Robert Johnston (Department of Biology, Johns Hopkins University, United States)

1:30 pm **Group B** (Theme: Neural Development and Patterning)

177 B1 Kinesin light chain 4 contributes to microtubule regulation and neuronal morphogenesis in zebrafish **Elizabeth Haynes**¹, Jaye “Henry” He², Marcel Jean-Pierre², Kevin Eliceiri³, Jan Huiskens³, Mary Halloran¹ (¹University of Wisconsin - Madison, USA; ²Morgridge Institute for Research, USA)


179 B3 Somatosensory axon-dependent development of a novel epidermal cell type in zebrafish. **Tanya Brown**¹, Emma Horton¹, Vic Lewis², Nathaniel Lee¹, Jeff Rasmussen¹ (¹University of Washington, USA; ²University of Oregon, Institute of Molecular Biology, USA)

180 B4 Sight promotes proliferation and survival of stem and progenitor cells in the optic tectum of zebrafish **Kara Cerveny**¹, Olivia Hagen¹, Hannah Rouse², Cameron Roberts², Elaine Kushkowski², Reid Bondurant¹, Máté Varga², Steve Wilson² (¹Reed College, USA; ²University College London, UK)
Multicolor lineage tracing using in vivo time-lapse imaging reveals coordinated death of clonally related cells in the developing vertebrate brain. **Zoe Cook**, Nicole L. Brockway, Marlitte J. O’Gallagher, Zachary J.C. Tobias, Mako Gedi, Kristine M. Carey, Vivek K. Unni, Y. Albert Pan, Margaret R. Metz, Tamily A. Weissman (Lewis & Clark College, USA; Oregon Health & Science University, USA; Virginia Tech, USA)

Tangential nucleus subtypes in the larval zebrafish are specified and organized independently of motoneuron-derived signals. **Dena S. Goldblatt**, Marie R. Greaney, Basak Rosti, Venkatarkushik Voleti, Citlali Perez Campos, Kripa B. Patel, Wenze Li, Elizabeth M.C. Hillman, David Schoppik (NYU Center for Neural Science, USA; NYU School of Medicine, Departments of Otolaryngology, Neuroscience & Physiology, Neuroscience Institute, USA; Mortimer B. Zuckerman Mind Brain Behavior Institute, Columbia University, USA)

2:00 pm **Group C** (Theme: Neural Development and Patterning)

**200 C1** Investigating the role of myc in clonal fitness in the developing zebrafish hindbrain. **Nhi Ho**, Nicole L. Brockway, Tamily A. Weissman (Lewis and Clark College, United States)

**201 C2** Studying meningeal development using the zebrafish. **Marina Venero Galanternik**, Ryan D. Gober, Daniel Castranova, Andrew E. Davis, Tuyet Nguyen, Bakary Samasa, Van Pham, Steven L. Coon, Joe Zoeller, Gennady Margolin, Louis E. Dye, Brant M. Weinstein (NICHD, NIH, USA)

**202 C3** Identification of a novel neuronal signal that regulates blood-brain barrier development. **Natasha O’Brien**, Chenghua Gu, Sean Megason (Harvard Medical School, USA)

**203 C4** The role of calcium activity in embryonic neural development. **Rithvik Nalamalapu**, Sudip Paudel, Margaret Saha (College of William and Mary, United States)

**204 C5** Development of a method to analyze spatiotemporal pattern of calcium activity in vivo in the neural plate of Xenopus. **Sudip Paudel**, Rithvik Nalamalapu, Elizabeth Li, Margaret Saha (College of William and Mary, USA)

**205 C6** Embryonic Alcohol Exposure Impacts the Progenitors of the Precerebellar Mossy Fiber Neurons. **Rebecca Landsberg**, Nia Brown, Jakub Mierzwa, Curtis Schutz (The College of St. Rose, USA)

2:30 pm **Break**

Live Q&A Poster Session 6

1:00 pm **Group A** (Theme: Cell Growth and Polarity; Genome Surveillance and Non-Coding RNAs)

**160 A1** Mechanisms regulating cytokinesis in the early C. elegans embryo. **Imge Ozugergin**, Karina Mastronardi, Alisa Piekny (Concordia University, CA)

**161 A2** ATXN10 as a novel ciliary associated protein involved in maintaining cell polarity in the developing heart and adult kidney. **Melissa Bentley**, Reagan Andersen, Mandy Croyle, Courtney Haycraft, Jeremy Reiter, Bradley Yoder (University of Alabama at Birmingham, USA; University of California San Francisco, USA)

**162 A3** Systematic identification of functional phosphorylation sites during developmental cell proliferation in vivo. **Zachary Lee**, Takuya Akiyama, Matthew Gibson (Stowers Institute for medical research, USA; The University of Kansas School of Medicine, USA)

**163 A4** The Drosophila Ste20 kinase Slik acts as an effector and a regulator of Rho1 GTPase in tissue growth modulation. **Neera Sriskandarajah**, Halil Bagci, Jean-François Côté, David R. Hipfner (Division of Experimental Medicine, Department of Medicine, McGill University, Montréal, Québec, CA; Institut de Recherches Cliniques de Montréal, Montréal, Québec, CA; Department of Anatomy & Cell Biology, McGill University, Montréal, Québec, CA; Department of Medicine, Université de Montréal, Montréal, Québec, CA)

**164 A5** Regulation of Polarity Establishment in the Developing Zebrafish Epidermis by aPKC and E-cadherin. **Prateek Arora**, Shivali Dongre, Renuka Raman, Mahendra Sonawane (Tata Institute of
Fundamental Research, Mumbai, IN; 2 Weill Cornell Medical College, New York, US

165 A6 Persistent DNA Repair Signaling during Mitosis Facilitates Acentric DNA Segregation Delisa Clay, Erin Jezuit, Heidi Bretscher, Don Fox (Duke University, USA)

1:30 pm **Group B** (Theme: Cell Adhesion, Migration, and Guidance)

183 B1 Building a planar signaling system that directs actin protrusion and collective migration of epithelial cells Audrey Williams, Sally Horne-Badovinac (University of Chicago, USA)

184 B2 Cdc103 promotes proliferation and directed migration in embryonic zebrafish myeloid cells Lauren Falkenberg, Sarah Beckman, Padmapriyadarshini Ravisankar, Tracy Dohn (Cincinnati Children's Hospital Medical Center, USA)

185 B3 Claudin-specific Interactions at the Tight Junction Cytoplasmic Plaque Enrique Gamero-Estevez¹, Aimee K. Ryan¹² (¹Department of Human Genetics, McGill University, Canada; ²Research Institute of the McGill University Health Centre, Canada)

186 B4 Elucidation of GDI2 as a regulator of Rab signaling at the primary cilia Kelsey Clearman¹, Jeremy Reiter², Bradley Yoder¹ (¹UAB, USA; ²UCSF, USA)

187 B5 Identifying and characterizing novel components in basement membrane adhesion in C. elegans Claire Gianakas, Daniel Keeley, David Sherwood (Duke University, USA)

2:00 pm **Group C** (Theme: Cell-Cell Signaling)

206 C1 Elucidating the BMP heterodimer signaling mechanism Benjamin Tajer, James Dutko, Mary Mullins (University of Pennsylvania, USA)

207 C2 Neuronal ribosomal protein function regulates Drosophila growth and development Lisa Deliu¹²³, Abhishek Ghosh¹²³, Deeshpaul Grewal¹²³, Savraj Grewal¹²³ (¹University of Calgary, CA; ²Arnie Charbonneau Cancer Institute, CA; ³Alberta Children’s Hospital Research Institute, CA)

208 C3 Sp5 acts downstream of Wnt8-Fz15/8-JNK signaling during positioning of ANE in sea urchin embryos Sujan Gautam¹, Marina Mart??nez-Bartolome?¹, Stephanie Burr², Ryan Range¹ (¹Auburn University, USA; ²University of Mississippi, United States)

209 C4 The IL2 sensory neurons regulate C. elegans peroxide resistance in a daf-16-independent manner Yuyan Xu, Javier Apfeld (Northeastern University, USA)

210 C5 Wnt pathway regulation of gastrulation and segmentation in penaeid shrimp Nusrat Jahan, Philip Hertzler (CENTRAL MICHIGAN UNIVERSITY, USA)

2:30 pm Break

Live Q&A Poster Session 7

1:00 pm **Group A** (Theme: Stem Cells and Tissue Regeneration)

166 A1 Single-cell transcriptomic analysis reveals unique cell types and patterns of gene expression in the frog corneal epithelium Surabhi Sonam, Sushant Bangru, Kimberly Perry, Auinash Kalsotra, Jonathan Henry (University of Illinois-Urbana Champaign, USA)

167 A2 Interleukin-11 signaling limits scar formation by antagonizing endothelial-to-myofibroblast transdifferentiation during zebrafish heart regeneration Srinivas Allanki¹, Yeszamin Onderwater¹, Alora Marks¹, Boris Strilic², Stefan Günther³, Didier Stainier³, Sven Reischauer¹ (¹Dept. of Developmental Biology, Max Planck Institute for Heart and Lung Research, Bad Nauheim, Germany; ²Dept. of Pharmacology, Max Planck Institute for Heart and Lung Research, Bad Nauheim, Germany; ³ECCPS Deep Sequencing Platform, Max Planck Institute for Heart and Lung Research, Bad Nauheim, Germany)

168 A3 Elucidating the role of cup-2 in the attachment of the C. elegans germline stem cell niche Lauren McMillan¹, Ramya Singh², Xin Wang³, David Hansen³ (¹University of Calgary, Canada; ²McGill University, Canada)

169 A4 The molecular basis of size regulation during axolotl limb regeneration Kaylee Wells, Kristina Kelley,
Hande Sahin, Warren Vieira, Catherine McCusker (University of Massachusetts, Boston, USA)

A5 The Molecular Mechanisms Underlying the Reprogramming of Pattern Information During Limb Regeneration Michael Raymond, Warren Vieira, Kaylee Wells, Jesse Schulz, Catherine McCusker (University of Massachusetts Boston, USA)

1:30 pm Group B (Theme: Stem Cells and Tissue Regeneration)

B1 Adult hematopoietic stem cell (HSC) clonality is determined by embryonic macrophage sensing of calreticulin on HSCs Samuel Wattrus1,2, Mackenzie Smith1,2, Elliott Hagedorn1,2, Leonard Zon1,2 (1Harvard University, USA; 2Boston Children's Hospital, USA)

B2 Understanding the Mechanisms of Cornea Wound Healing using lineage tracing in a model of Stem Cell Deficiency in the frog, Xenopus Mohd Tayyab Adil, Claire Simons, Surabhi Sonam, Jonathan Henry (University of Illinois Urbana Champaign, USA)

B3 Skeletal stem cells are maintained in a Wnt-inhibitory environment within the resting zone of the epiphyseal growth plate Shawn Hallett (University of Michigan School of Dentistry, USA)

B4 Hedgehog Signaling Regulates Cell Dynamics in Zebrafish Scale Regeneration Maya Evanitsky, Alessandro De Simone, Stefano Di Talia (Duke University, USA)

B5 Non-conventional allogeneic response in chimeric planarians causes regeneration defects Chew Chai1, Jesse Gibson1, Margarita Khariton1, Bo Wang1,2 (1Department of Bioengineering, Stanford University, USA; 2Department of Developmental Biology, Stanford University, USA)

B6 Ectopic kcnh2a slows niche-to-mesenchyme transitions to prolong fin outgrowth in longfin zebrafish Heather Le Bleu, Scott Stewart, Gabriel Yette, Astra Henner, Joshua Braunstein, Jad Chehab, Michael Harms, Kryn Stankunas (University of Oregon, USA)

2:00 pm Group C (Theme: Stem Cells and Tissue Regeneration)

C1 Mechanisms of Wnt target gene regulation by Hif1α during Xenopus tail regeneration Jeet Patel, Preston Scattinger, Christopher Braden, Andrea Wills (University of Washington, USA)

C2 Suspending Cell Death - A Novel Stem Cell Response to Injury in Planarians Divya Shiroor, Tisha Bohr, Carolyn Adler (Cornell University, USA)

C3 Endoglin is an Inhibitor of Cardiomyocyte Proliferation Daniel Sorensen, Yasuhiko Kawakami (University of Minnesota Twin Cities, USA)

C4 PPARdelta signaling induces metabolic maturation in pluripotent stem cell-derived cardiomyocytes through enhanced fatty acid oxidation. Nadeera Wickramasinghe1, Irene Turnbull1, David Sachs1, Priyanka Dhanan1, Denis Torre1, Serena Raimo2, Joshua Mayourian1, Arne Hansen3, Thomas Eschenhagen1, Harry Ischiropoulos2, Avi Ma’ayan2, Sander Houten1, Kevin Costa3, Nicole Dubois1 (1Icahn School of Medicine at Mount Sinai, USA; 2Children's Hospital of Philadelphia Research Institute, USA; 3University Medical Center Hamburg-Eppendorf, Germany)

C5 A model for necrosis in Drosophila reveals regeneration by tissue remodeling Jacob Klemm (Arizona State University, USA)

C6 Investigating Support Cell Shape Change and Actin Dynamics During Zebrafish Hair Cell Death and Regeneration Madeleine Hewitt, David Raible (University of Washington, Seattle, USA)

2:30 pm Break

Live Q&A Poster Session 8

1:00 pm Group A (Theme: Development and Evolution)

A1 NODAL signalling activity is initiated after establishment of the human pluripotent epiblast and is not required for its maintenance prior to implantation. Anna Sophie Brumm, Dr. Afshan McCarthy, Dr. Claudia Gerri, Dr. Todd Fallesen, Dr. Caroline Hill, Dr. Kathy Niakan (The Francis Crick Institute, GB)

A2 Expansion of a pre-existing signaling center underlies the evolution of a morphological novelty in the
**Drosophila genitalia** Donya Shodja, William Glassford, Mark Rebeiz (Department of Biological Sciences, University of Pittsburgh, USA)

**A3** Mesenchymal Slit2 and Slit3 are required for pancreatic islet morphogenesis Jennifer Gilbert, Barak Blum (UW Madison, USA)

**A4** Primary Proliferation Pathways are Repressed by Novel Secretory Cell During Intestinal Development in Zebrafish Morgan Prochaska, Jianlong Li, Margaret Dedloff, Lea Maney, Cintia Hongay, Kenneth Wallace (Clarkson University, United States)

**A5** Spatial reconstruction of single-cell transcriptomic data enables systematic dissection of Hox dependent tissue segmentation in the starlet sea anemone Nemastostella vectensis Shuonan He, Wanqing Shao, Matthew Gibson (1Stowers Institute for Medical Research, Kansas City, MO 64110, USA; 2Department of Genetics, Center for Genome Sciences and System Biology, Washington University School of Medicine, St Louis, MO 63108, USA; 3Department of Anatomy and Cell Biology, The University of Kansas, School of Medicine, Kansas City, KS 66160, USA)

**A6** Alternative Splicing is Differentially Regulated During Limb Development Fjodor Merkuri, Jennifer Fish, Fredric Chain (University of Massachusetts Lowell, USA)

1:30 pm **Group B** (Theme: Development and Evolution)

**B1** Origin, function and evolution of pharyngeal arch signalling centres in jawed vertebrates Jenaid Rees, Andrew Gillis (1Department of Zoology, University of Cambridge, Cambridge CB2 3EJ, GB; 2Whitman Center, Marine Biological Laboratory, Woods Hole, MA 02543, USA)

**B2** The fast and furious hypertrophy of Xenopus head cartilages Jason Nguyen, Brian Eames (University of Saskatchewan, CA)

**B3** Clues of multichambered heart evolution are revealed through analysis of zebrafish hearts with adaptive remodeling of the sinus venosus Jacob Gafranek, Padmapriyadarshini Ravisankar, Josua Waxman (1Cincinnati Children’s Hospital Medical Center, USA; 2University of Cincinnati, USA)

**B4** Comparative transcriptomics reveals the gene regulatory network driving osteoblast differentiation and highlights differences between bones of tetrapods and fish Patsy Gomez Picos, Katie Ovens, Amir M Ashique, Ian McQuillan, Brian F Eames (University of Saskatchewan, CA)

**B5** Novel roles of Pax6 transcription factor gene eyeless in the developing Tribolium compound eye Qing Chen, Markus Friedrich (1Department of Biological Sciences, Wayne State University, 5047 Gullen Mall, Detroit, MI 48202, United States; 2Department of Anatomy and Cell Biology, Wayne State University, School of Medicine, 540 East Canfield Avenue, Detroit, MI 48201, United States)

**B6** Comparative Study of Retinal Development in the Mouse and Thirteen-lined Ground Squirrel Sruti Patoori, Marilyn Matthews, Dana Merriman, Mark Emerson (1City University of New York Graduate Center, USA; 2The City College of New York, USA; 3University of Wisconsin Oshkosh, USA)

2:00 pm **Group C** (Themes: Epigenetics; Functional Genomics)

**C1** Dnmt1a is required for the maternal-zygotic transition in the wasp Nasonia Deanna Arsala, Xin Wu, Soojin V. Yi, Jeremy A. Lynch (1University of Illinois at Chicago, United States; 2Georgia Tech, United States)

**C2** Drosophila gametogenesis requires a feedback loop between heterochromatin and the nucleopore complex Kahini Sarkar, Alicia McCarthy, Elliot Martin, Alex Lemus, Justin Camacho, Ayman Iqbal, Hugo Stern, Alex Valm, Prashanth Rangan (1University at Albany SUNY, United States; 210x Genomics Headquarters, United States)

**C3** Closing in on targets: Early HDAC activity is required for appendage regeneration Hannah Arbach, Marcus Harland-Dunaway, Alexander Chitsazan, Eleanor Pickering, Christopher Braden, Andrea Wills (University of Washington, USA)

**C4** Integration of signaling systems within the neural crest gene regulatory network via TFAP2 pioneer factors Megan Rothstein, Marcos Simoes-Costa (Cornell University, USA)
Identifying the direct regulatory targets of TBX5 in developing external genitalia
Aaron Alcala, Sungdae Park, Catherine Brown, Douglas Menke (University of Georgia, USA)

ISL1 Targets Conserved Appendage Enhancers During Development of the Amniote Phallus
Sergio Minchey, Sungdae Park, Douglas Menke (University of Georgia, USA)

2:30 pm Break

Live Q&A Poster Session 9

3:00 pm Group A (Theme: Cell Fate Specification and Differentiation)

Characterizing the role of canonical bone morphogenetic protein (BMP) signaling in murine preimplantation lineage specification
Robin Seay, Tristan Frum, Amy Ralston (Michigan State University, USA; University of Michigan, USA)

Fragility in specification; glial cells and the RNA binding protein FMRP
Caleb Doll, Bruce Appel (Department of Pediatrics, University of Colorado School of Medicine, Anschutz Medical Campus, USA)

Gastrointestinal transcription factors drive lineage-specific developmental programs in organ specification and cancer
Roshane Francis, Haiyang Guo, Catherine Streutker (The Hospital for Sick Children, Canada; University of Toronto, Canada; Princess Margaret Cancer Centre, Canada; St. Michael’s Hospital, Canada; The Second Hospital of Shandong University, China)

Ablating Sonic Hedgehog Signaling Regulator Suppressor of Fused Alters Neural Cell Fate
Danielle Spice (Western University, CA)

Neural crest development is temporally regulated by miR-302
Rachel Keuls (Baylor College of Medicine, USA)

Modular tendon fate specification through nuclear receptor Nr5a2 in lower jaw and middle ear
Hung-Jhen Chen (Eli and Edythe Broad Center for Stem Cell and Regenerative Medicine, University of Southern California, USA)

3:30 pm Group B (Theme: Cell Fate Specification and Differentiation)

Investigating the emergence of vertebrate cranial cartilage diversity
Mathi Thiruppathy, Peter Fabian, Kuo-Chang Tseng, Pengfei Xu, Gage Crump (University of Southern California, USA)

hoxb5b enhances neural crest cell production along the vagal axial region in a temporally-defined manner during zebrafish embryogenesis
Aubrey Howard, Aaron Nguyen, Grayson Kotzur, Priya Ravisankar, Eileen W. Singleton, Can Li, Can Li, Joshua S. Waxman, Rosa A. Uribe (Rice University, USA; California Institute of Technology, USA; Cincinnati Children’s Hospital Medical Center and University of Cincinnati College of Medicine, USA)

Clonal analysis reveals multipotency of vagal neural crest cells toward cardiac and enteric fates
Weiyi Tang, Yuwei Li, Ang Li, Marianne Bronner (California Institute of Technology, USA; University of Texas at Arlington, USA)

Reprogramming Axial Level Identity to Rescue Neural-Crest-Related Congenital Heart Defects
Shashank Gandhi, Max Ezin, Marianne Bronner (California Institute of Technology, USA; Loyola Marymount University, USA)

Maintaining neural crest multipotency with canonical Wnt signaling
Yu Ji, Shuwen Zhang, Ran Gu, Kurt Reynolds, Mohammad Islam, Yue Liu, Chengji Zhou (University of California, Davis, USA; Shriners Hospitals for Children, USA)

A two-step mechanism for foveolar cone patterning in human retinal organoids
Katarzyna Hussey, Kiara Eldred, Clayton Santiago, Seth Blackshaw, Robert Johnston (Johns Hopkins University, USA)

4:00 pm Group C (Theme: Cell Fate Specification and Differentiation)

Retinoic acid differentially affects first and second heart field progenitor development within the
anterior lateral plate mesoderm Tiffany Duong\textsuperscript{1,2}, Andrew Holowiecki\textsuperscript{1}, Joshua Waxman\textsuperscript{1,2} (\textsuperscript{1}Cincinnati Children's Hospital Medical Center, USA; \textsuperscript{2}University of Cincinnati College of Medicine, USA)

270 C2 Profiling Atrial-Ventricular Specification During Early Mouse Development Through Single Cell RNA Sequencing David Gonzalez\textsuperscript{1,2}, Kristin Beaumont\textsuperscript{3}, Robert Sebra\textsuperscript{3}, Nicole Dubois\textsuperscript{1,2} (\textsuperscript{1}Mindich Institute for Child Health and Development, Icahn School of Medicine of Mount Sinai, USA; \textsuperscript{2}Cell, Development, and Regenerative Biology Department, Icahn School of Medicine at Mount Sinai, USA; \textsuperscript{3}Dept of Genetics and Genomics, Icahn School of Medicine at Mount Sinai, USA)

271 C3 Nr2f1a maintains nkx2.5 expression to repress sinoatrial node identity within venous atrial cardiomyocytes Kendall Martin\textsuperscript{1,2}, Padmapriyadarshini Ravisankar\textsuperscript{1}, Joshua Waxman\textsuperscript{1} (\textsuperscript{1}Cincinnati Children's Hospital Medical Center, USA; \textsuperscript{2}University of Cincinnati, USA)

272 C4 in vivo epigenetics roadmap of cell fate regulation by the lung lineage transcription factor NK Homeobox 2-1 Danielle Little\textsuperscript{1,2,3}, Anne M. Lynch\textsuperscript{1,3}, Yan Yun\textsuperscript{1,2,4}, Haruhiko Akiyama\textsuperscript{4}, Shioko Kimura\textsuperscript{5}, Jichao Chen\textsuperscript{1} (\textsuperscript{1}MD Anderson Cancer Center, USA; \textsuperscript{2}University of Texas MD Anderson Cancer Center Graduate School of Biomedical Sciences, USA; \textsuperscript{3}Baylor College of Medicine Graduate School of Biomedical Sciences, USA; \textsuperscript{4}Kyoto University, Japan; \textsuperscript{5}National Institutes of Health, USA)

273 C5 Characterization of a New Epithelial Progenitor Cell in the Developing Human Lung Ansley Conchola, Alyssa J. Miller, Tristan Frum, Jason R. Spence (University of Michigan, USA)

274 C6 Skin-derived ionocytes contribute to hair cell-containing mechanosensory organs in a salinity-dependent manner Julia Peleggia de Castro\textsuperscript{1}, Daniela Muench\textsuperscript{1}, Paloma Ivon Meneses Giles\textsuperscript{1}, Andrés Romero-Carvajal\textsuperscript{2}, Melainia McClain\textsuperscript{1}, Tatjana Piotrowski\textsuperscript{1} (\textsuperscript{1}Stowers Institute for Medical Research, USA; \textsuperscript{2}Pontificia Universidad Católica del Ecuador, Ecuador)

4:30 pm Break

Live Q&A Poster Session 10

3:00 pm Group A (Themes: Emerging Research Organisms; Genetic Models of Disease)
229 A1 Evolution of limb loss in snakes and functional testing of a limb specific shh enhancer in lizards Sukhada Samudra, Elizabeth Esser, Jonathan Eggerschwiler, Douglas Menke (University of Georgia, USA)
230 A2 Characterization of retinal cell types in the African spiny mouse (Acomys cahirinus) Jessica Bills, Ann Morris (University of Kentucky, USA)
231 A3 Adaptation of proximity-dependent biotinylation approaches to early zebrafish embryos Shimon Rosenthal\textsuperscript{1,2,3}, Hala Abdouni\textsuperscript{3}, Tess Branon\textsuperscript{4}, Alice Ting\textsuperscript{5,6}, Anne-Claude Gingras\textsuperscript{1,2,3}, Ian Scott\textsuperscript{1,2} (\textsuperscript{1}Department of Molecular Genetics, University of Toronto, Canada; \textsuperscript{2}Program in Developmental and Stem cell Biology, The Hospital for Sick Children, Canada; \textsuperscript{3}The Lunenfeld-Tanenbaum Research Institute, Mount Sinai Hospital, Canada; \textsuperscript{4}Department of Chemistry, Massachusetts Institute of Technology, USA; \textsuperscript{5}Departments of Genetics, Biology, and Chemistry, Stanford University, USA)
232 A4 Syntaxin 4 Regulates Cardiac Conduction in Vertebrate Cardiomyocytes Eliyahu Perl\textsuperscript{1}, Padmapriyadarshini Ravisankar\textsuperscript{2}, Carlos E Prada\textsuperscript{1,2,3}, Joshua S Waxman\textsuperscript{1,2,3} (\textsuperscript{1}University of Cincinnati College of Medicine, Cincinnati, OH, USA; \textsuperscript{2}Cincinnati Children's Hospital Medical Center, Cincinnati, OH, USA; \textsuperscript{3}Fundación Cardiovascular de Colombia FCV, Colombia; Fundación Universitaria FCV, Colombia)
233 A5 Myelination regulatory factor is essential for mouse embryonic development Lida Langroudi (University of Toronto, CA)
414 A6 The ciliary protein Arl13b regulates axon guidance and cerebellar development in the mouse hindbrain Sarah Suciu, Alyssa Long, Tamara Caspary (Emory University, USA)

3:30 pm Group B (Theme: Morphogenesis)
251 B1 Basal epidermis collective migration and local Sonic hedgehog signaling promote fin skeletal branching morphogenesis Amy Robbins, Joshua Braunstein, Scott Stewart, Kryn Stankunas (University of Oregon
**Hedgehog-activated Fat4 and Planar Cell Polarity Pathways Mediate Mesenchymal Cell Clustering and Villus Formation in Gut Development**

Abilasha Rao-Bhatia, Min Zhu, Wen-Chi Yin, Sabrina Coquenlorge, Xiaoyun Zhang, Janghee Woo, Yu Sun, Charlotte H. Dean, Aimin Liu, Chi-chung Hui, Ramesh A. Shivdasani, Helen McNeill, Sevan Hopyan, Tae-Hee Kim (Program in Developmental and Stem Cell Biology, The Hospital for Sick Children, Canada; Department of Molecular Genetics, University of Toronto, Canada; Department of Mechanical and Industrial Engineering, University of Toronto, Canada; Department of Medical Oncology and Center for Functional Cancer Epigenetics, Dana-Farber Cancer Institute, USA; Department of Medicine, Harvard Medical School, USA; National Heart and Lung Institute, Imperial College, UK; Huck Institute of Life Sciences, The Pennsylvania State University, USA; Department of Biology, Washington University School of Medicine, USA)

**Progesterone-WNT5A signaling mediated uterine luminal folding is essential for embryo-uterine axis alignment**

Manoj Madhavan, Diana Flores, Ripla Arora, Jamie Huang, Yingxia Gong, Dongmei Ma, Bing He (Department of Biomedical Engineering, Michigan State University, USA; Institute for Quantitative Health Science and Engineering, Michigan State University, USA; Department of Obstetrics, Gynecology and Reproductive Biology, Michigan State University, USA)

**ALAn: A tool for automated analysis of epithelial layer architecture**

Nicole Dawney, Christian Cammarota, Dan Bergstralh (University of Rochester, USA)

**Dunk interacts with anillin and regulates its cortical localization during Drosophila cellularization**

Jiayang Chen, Melissa Wang, Bing He (Dartmouth College, USA)

**Investigating growth regulation within synchronously developing epithelia**

Sophia Friesen, Iswar Hariharan (University of California, Berkeley, USA)

**Cell-level analysis of fusion during avian lung development**

Michael Palmer, Celeste Nelson (Princeton University, USA)

**Rab35 regulates skeletogenesis and gastrulation by facilitating actin remodeling and vesicular trafficking**

Carolyn Remsburg, Jia Song (University of Delaware, USA)

**Cell polarity determinantDlg1 facilitates epithelial invagination by regulating tissue-scale mechanical coordination**

Melisa Fuentes (Dartmouth College, USA)

**PR/SET Domain 5: A Critical Transcriptional Regulator of Craniofacial Development**

Ellen Potoczky, Sophie Wisniak, Quinten Schwarz (University of South Australia, AU; Centre for Cancer Biology, AU; SA Pathology, AU)

**Decreased function of the Kir2.1 potassium channel sensitizes mice to craniofacial defects due to nicotine-vaping**

Yunus Ozekin (University of Colorado Anschutz Medical Campus, USA)

**The novel ECM protein SNED1 regulates neural crest cells for proper craniofacial development**

Anna Barque Falguera, Martin N. Davis, Kyleen Jan, Emanuel De La Fuente, Christina L. Nicholas, Alexandra Naba (Department of Physiology and Biophysics, University of Illinois at Chicago, Chicago, IL, USA; Department of Orthodontics, University of Illinois at Chicago, Chicago, IL, USA)

**Cellular heterogeneity of the LH receptor and its significance for cyclic GMP signaling in mouse preovulatory follicles**

Corie Owen, Valentina Baena, Tracy UlIASZ, Katie Lowther, Siu-Pok Yee, Mark Terasaki, Jeremy Egbert, Laurinda Jaffe (UConn Health, USA)
A2 Interaction of the DBL-1/BMP signaling pathway with BLMP-1/BLIMP1 in Caenorhabditis elegans
Mohammed Farhan Lakdawala, Neethu Issac, Tina Gumienny (Texas Woman's University, USA)

A3 Deep cytoplasmic sorting during Xenopus oocyte-to-embryo transition Jing Yang-2, Hyojeong Hwang, Jia Fu, Wenyan Mei (Univ of Illinois At Urbana-Champaign, USA)

A4 Morphogenesis of Distinct Lumen Wrinkling Patterns Along the Developing Intestinal Tract Hasreet Gill1, Sifan Yin2, Nandan Nerurkar3, Tyler Huycke1, L. Mahadevan4, Cliff Tabin1 (1Harvard Medical School, USA; 2Tsinghua University, China; 3Columbia University, USA; 4Harvard University, USA)

A5 TGFβ and BMP signaling synchronize the initiation of midgut asymmetry Bhargav Sanketi, Elizabeth Bundschuh, Sharada Gopal, Natasza Kurpios (Department of Molecular Medicine, Cornell University College of Veterinary Medicine, USA)

A6 Dachsous Cadherin Related-1 and the Septin Cytoskeleton: A Molecular and Developmental Etiology Underlying Mitral Valve Prolapse Kelsey Moore, Reece Moore, Rebecca Stairley, Mary Kate Rumph, Connor Graham, Sameer Abrol, Diana Fulmer, Lilong Guo, Cortney Gensemer, Christina Wang, Tyler Beck, Rupak Mukherjee (Medical University of South Carolina, USA)

3:30 pm Group B (Theme: Mechanical Influences of Cell and Tissue Development)

B1 Transgenic sensors to measure nuclear mechanotransduction in vivo Kelli Fenelon1,2, Evan Thomas2, Sevan Hopyan1,2,3 (1Department of Molecular Genetics, University of Toronto, Canada; 2Program in Developmental and Stem Cell Biology, Research Institute, The Hospital for Sick Children, Canada; 3Division of Orthopaedic Surgery, Hospital for Sick Children and University of Toronto, Canada)

B2 A Precision Stretcher for Developmental Mechanobiology Jing Yang -1, Lance A Davidson (University of Pittsburgh, USA)

B3 A feedback mechanism mediated by myosin-dependent apical accumulation of Rab11 vesicles in apical constriction Wei Chen, Bing He (Department of Biological Sciences, Dartmouth College, United States)

B4 Regulation of cell contact and tissue organization by Eph/ephrin signaling Abigail Kindberg, Vasudha Srivastava, Jonathon Muncie, Valerie Weaver, Zev Gartner, Jeffrey Bush (UCSF, USA)

B5 Exploring the passive mechanics of early neurulation through computational modeling Sommer Anjum, Lance Davidson (University of Pittsburgh, United States)

B6 Myocardial Afterload is A Key Biomechanical Regulator of Valve Development Neha Ahuja1, Paige Ostwald1, Alex Gendernalik1, Elena Guzzolino2, Letizia Pitt2, David Bark1, Deborah Garrity1 (1Colorado State University, USA; 2Consiglio Nazionale delle Ricerche, Italy)

4:00 pm Group C (Theme: Single Cell Analysis)

C1 Shifts in chromatin accessibility define the developmental trajectories of neural crest cells Austin Howland, Marcos Simoes-Costa (Cornell University, USA)

C2 Single cell transcriptome and open chromatin region analysis of development of cranial neural crest-derived cell populations in zebrafish. Kuo-Chang Tseng, Peter Fabian (University of Southern California, USA)

C3 Heterogeneous effects of Hoxa2 in mouse cranial neural crest cells establish axial identity Irina Pushel, Robb Krumlauf (Stowers Institute for Medical Research, USA)

C4 Single-cell transcriptomics reveals early emergence of liver parenchymal and non-parenchymal cell lineages Jeremy Lotto1,2, Sibyl Drissler1,2, Rebecca Cullum2, Wei Wei2, Manu Setty2, Erin M. Bell3, Stéphane C. Boutet4, Sonja Nowotschin3, Ying-Yi Kuo3, Vidur Garg3, Dana Pe’er3, Deanna M. Church4, Anna-Katerina Hadjantonakis5, Pamela A. Hoodless1,2 (1The University of British Columbia, Canada; 2BC Cancer, Canada; 3Sloan Kettering Institute, USA; 410X Genomics, USA)

C5 New insights into gonadal sex differentiation provided by single cell transcriptomics in the chicken embryo. Martin Estermann, Sarah Williams, Craig Smith (Monash University, AU)

C6 Rauber’s Layer Disappearance and Proamniotic Cavity Formation: two strategies for the same end? Peter Pfeffer1, Jessica van Leeuwen2, Debra Berg2, David Wells2, Pisana Rawson1 (1Victoria University of
Live Q&A Poster Session 12

3:00 pm **Group A** (Theme: Neural Development and Patterning)

**239 A1** The function of Scribble in neural convergent extension **Alyssa Lesko**, Ann Sutherland (Department of Cell Biology, University of Virginia, USA)

**240 A2** The Role Of Hepatoma Derived Growth Factor In Postnatal Neural Stem Cells **Yutong Li**, Adrianne Watson (University of Alberta, Canada)

**241 A3** Impaired cortical cytoarchitecture and reduced excitability of deep layer neurons in the offspring of diabetic rats **Rocío Valle-Bautista**1,2, Berenice Márquez-Valadez1,2, América D. Fragozo-Cabrera2, Néstor Fábian Díaz2, Gabriel Herrera-López3, Ernesto Griego3, Emilio J Galván3, José Antonio Arias-Montaño1, Anayansi Molina-Hernández2 (1Departamento de Fisiología, Biofísica y Neurociencias, Centro de Investigación y de Estudios Avanzados del Instituto Politécnico Nacional., Mexico; 2Laboratorio de Investigación en Células Troncales y Biología del Desarrollo, Departamento de Fisiología y Desarrollo Celular, Subdirección de Investigación Biomédica, Instituto Nacional de Perinatología Isidro Espinosa de los Reyes, Mexico; 3Departamento de Farmacobiología, Centro de Investigación y de Estudios Avanzados del Instituto Politécnico Nacional, Mexico)

**242 A4** Transcriptional regulation of MGE progenitor proliferation by PRDM16 controls cortical GABAergic interneuron production **Miguel Turrero García**1, José Manuel Baizabal1,4, Diana Tran1, Rui Peixoto2,5, Wengang Wang2, Yajun Xie1, Manal Adam1, Lauren English1, Christopher Reid1, Salvador Brito1, Matthew Booker3, Michael Tolstorukov1, Corey Harwell1 (1Harvard Medical School, USA; 2Howard Hughes Medical Institute, USA; 3Dana-Farber Cancer Institute, USA; 4Indiana University, USA; 5University of Pittsburgh, USA)

**243 A5** The tyrosine phosphatase PTPRD regulates embryonic neurogenesis during cortical brain development **Francisca Cornejo**1, Tomita Hideaki1, Begoña Aranda-Pino1, Cameron L Woodard2, Constanza C Riosseco1, Benjamin G Neel1, David R Kaplan2,4, Freda D Miller2,4, Gonzalo I Cancino1 (1Center for Integrative Biology, Facultad de Ciencias, Universidad Mayor, Chile; 2Hospital for Sick Children, Canada; 3New York University Langone Health, USA; 4University of Toronto, Canada)

**244 A6** Let-7 mediates progenitor cell cycle length during S/G2 in the embryonic retina and cerebral cortex **Corinne Fairchild**, Simranjeet Cheema, Joanna Wong, Keiko Hino, Mikaela Louie, Sergi Simo, Anna La Torre (UC Davis, USA)

3:30 pm **Group B** (Themes: Neural Development and Patterning; Gene Regulation and Chromosome Topology)

**263 B1** Ccer2: A Novel Gene Upregulated in the Early Stages of Mammalian Sensory Hair Cell Differentiation **Emilia Luca**1, Joanna F. Mulvaney1, Gianluca Sampieri1, Alain Dabdoub1,2,3 (1Sunnybrook Research Institute, CA; 2Department of Otolaryngology - Head & Neck Surgery, University of Toronto, CA; 3Department of Laboratory Medicine and Pathobiology, University of Toronto, CA)

**264 B2** A gradient of Wnt activity regulates the spatial patterning of inner ear sensory organs **Magdalena Zak**, Nicolas Daudet (UCL Ear Institute, University College London, United Kingdom)

**265 B3** Identifying signals downstream of canonical Wnt signalling during prosensory specification in the inner ear. **Thea Stole**1, Dr. Magdalena Zak1, Dr. Vincent Plagnol1, Dr. Nicolas Daudet1 (1UCL Ear Institute, University College London, United Kingdom; 2University College London Genetics Institute, United Kingdom)

**266 B4** Investigation of RNA Polymerase II Elongation Factor Ell2 Regulation By the Cataract-Linked RNA-Binding Protein Celf1 in Mouse Lens Development **Francisco G. Hernandez**, Sandeep Aryal, Archana D. Siddam, Salil A. Lachke (University of Delaware, United States)
Elucidating the mechanism by which OCT4 and GATA6 direct primitive endoderm cell fate in pre-implantation mouse embryos via repression of TE genes
Tayler Murphy¹, Tristan Frum², Amy Ralston¹
(¹michigan state university, USA; ²university of michigan, USA)

Chromatin topology and the timing of enhancer function at the HoxD locus
Eddie Rodriguez Carballo¹, Lucille Lopez-Delisle², Andrésa Willemin¹, Leonardo Beccari¹, Sandra Gิตto¹, Bénédicte Mascréz¹, Julien Codoüey¹, Denis Duboule¹,²,³ (¹University of Geneva, Switzerland; ²EPFL, Switzerland; ³Collège de France, France)

Investigating the relationship between genome organization of paired chromosomes and genome function at the single cell level in Drosophila
Jumana AlHaj Abed¹, Jelena Erceg¹, Anton Goloborodko², Son C. Nguyen¹, Ruth B. McCole¹, Wren Saylor¹, Antonios Lioutas¹, Guy Nir¹, Geoffrey Fudenberg², Bryan R. Lajoie³, Job Dekker³, Leonid A. Mirny²,⁴, Chao.-Ting Wu¹,⁵ (¹Harvard Medical School, Department of Genetics, USA; ²Massachusetts Institute of Technology, Institute for Medical Engineering and Science, USA; ³Howard Hughes Medical Institute and Program in Systems Biology, University of Massachusetts Medical School, Department of Biochemistry and Molecular Pharmacology, USA; ⁴Massachusetts Institute of Technology, Department of Physics, USA; ⁵Wyss Institute for Biologically Inspired Engineering, Harvard University, USA)

The connectome of neural crest enhancers reveals regulatory features of signaling systems
Ana Azambuja, Marcos Simoes-Costa (Cornell University, USA)

Zygotic Arrest Proteins 1 and 2 Interact with Other Proteins Associated with Germ Granules In Xenopus laevis
Jeffrey Mayfield (University of Colorado Denver, United States)

Poly(A) tail dynamics during early development in Xenopus laevis
Megan Cerny, Kelly Crandall, Marco Zocchi, Cameron Corno, Amanda Charlesworth (University of Colorado Denver, United States)

Determining the gene regulatory network for hair cell regeneration in the zebrafish adult inner ear at single-cell resolution
Erin Jimenez¹,², Claire Slevin¹,², Wei Song¹,³, Ivan Ovcharenko¹,³, Shawn Burgess¹,² (¹National Institutes of Health, USA; ²National Human Genome Research Institute, USA; ³National Center for Biotechnology Information, USA)

Dynamic microRNAs (miRNAs) and their target mRNAs in zebrafish heart development
Chelsea Herdman¹, Bradley L. Demarest¹, Katherine A. Morelli¹, Edgar J. Hernandez²,³, Mark Yandell²,³, H. Joseph Yost²,³ (¹Molecular Medicine Program, School of Medicine, University of Utah, USA; ²Department of Human Genetics, University of Utah, USA; ³Utah Center for Genetic Discovery, University of Utah, USA; ⁴Department of Neurobiology and Anatomy, University of Utah, USA; ⁵Department of Pediatrics, University of Utah, USA)

4:30 pm Break

TUESDAY JULY 14

Live Q&A Poster Session 13

11:00 am Group A (Theme: Emerging Research Organisms)

A versatile depigmentation, clearing, and labeling strategy for advancing the exploration of organs and nervous systems across animal phyla
Florian Raible¹, Marko Pende²,³, Karim Vadiwala¹, Hannah Schmidbaur¹, Alexander Stockinger¹, Prayag Murawala¹, Saiedeh Saghazi², Marcus Dekens¹, Klaus Becker²,³, Roger Revilla-i-Domingo¹, Sofia-Christina Papadopoulos², Martin Zurl¹, Pawel Pasierbek⁵, Oleg Simakov¹, Elly Tanaka⁴, Hans-Ulrich Dölt²,³ (¹University of Vienna, AT; ²Vienna University of Technology, AT; ³Medical University of Vienna, AT; ⁴Research Institute of Molecular Pathology, AT; ⁵Institute of Molecular Biotechnology, AT)

Sex-specific yeast interfering RNA larvicides for effective sex sorting in the human disease vector mosquito Aedes aegypti
Jessica Igiede¹,², Laura Gerber¹, John J. Kosmach¹,², Max P. Scheel¹, Keshava
Mysore\textsuperscript{1,2}, Molly Duman-Scheel\textsuperscript{1,2} (\textsuperscript{1}Indiana University School of Medicine, United States; \textsuperscript{2}University of Notre Dame, United States)

\textbf{295 A4} \textit{Live Imaging of Intracranial Lymphatics in the Zebrafish} \textbf{Daniel Castranova}, Bakary Samasa, Marina Venero Galanternik, Hyun Min Jung, Van Pham, Brant Weinstein (Eunice Kennedy Shriver National Institute of Child Health and Human Development, NIH, USA)

\textbf{296 A5} \textit{Identifying novel molecular mechanisms underlying lateral line sense organ development using an unbiased, comparative approach} \textbf{Alexander S. Campbell}\textsuperscript{1}, Martin Minarik\textsuperscript{1}, David Gela\textsuperscript{2}, Martin Psenicka\textsuperscript{2}, Clare V. H. Baker\textsuperscript{1} (\textsuperscript{1}Department of Physiology, Development & Neuroscience, University of Cambridge, United Kingdom; \textsuperscript{2}Faculty of Fisheries & Protection of Waters, University of South Bohemia, Czech Republic)

\textbf{297 A6} \textit{Investigating the Specification of Hair Cells Versus Electroreceptors in the Lateral Line Using CRISPR/Cas9 in a Sturgeon} \textbf{Martin Minarik}\textsuperscript{1}, Alexander S. Campbell\textsuperscript{1}, Melinda S. Modrell\textsuperscript{1}, David Gela\textsuperscript{2}, Martin Psenicka\textsuperscript{2}, Clare V. H. Baker\textsuperscript{1} (\textsuperscript{1}Department of Physiology, Development and Neuroscience, University of Cambridge, United Kingdom; \textsuperscript{2}Research Institute of Fish Culture and Hydrobiology, Faculty of Fisheries and Protection of Waters, University of South Bohemia in Ceske Budejovice, Czechia)

11:30 am \textbf{Group B} (Theme: Cell Adhesion, Migration and Guidance)

\textbf{315 B1} \textit{Unique and Overlapping Effects of Triiodothyronine (T3) and Thyroxine (T4) on Sensory Innervation of the Chick Cornea} \textbf{Tyler Schwend}\textsuperscript{1}, Mansi Patel\textsuperscript{1}, Ngan Pham\textsuperscript{1}, Elise Ziegenhorn\textsuperscript{1}, Alyssa Pisano\textsuperscript{1}, Ryan Deaton\textsuperscript{2}, Shinho Kim\textsuperscript{1}, Vandhana Rajarathnam\textsuperscript{1} (\textsuperscript{1}Illinois Wesleyan University, USA; \textsuperscript{2}University of Illinois - Chicago, USA)

\textbf{316 B2} \textit{An Axon-Pathfinding Mechanism Preserves Epithelial Tissue Integrity} \textbf{Dan Bergstralh}, Christian Cammarota, Tara Finegan, Tyler Wilson, Sifan Yang (University of Rochester, USA)

\textbf{317 B3} \textit{Rap1 regulates actomyosin dynamics to drive rapid wound repair} \textbf{Katheryn Rothenberg}\textsuperscript{1,2}, Rodrigo Fernandez-Gonzalez\textsuperscript{1,2,3} (\textsuperscript{1}Institute for Biomaterials and Biomedical Engineering, University of Toronto, Canada; \textsuperscript{2}Ted Rogers Centre for Heart Research, University of Toronto, Canada; \textsuperscript{3}Department of Cell and Systems Biology, University of Toronto, Canada)

\textbf{318 B4} \textit{Uncovering the Podocyte Foot Process Proteome} \textbf{Gary F. Gerlach}, Lori O’Brien (University of North Carolina at Chapel Hill, USA)

\textbf{319 B5} \textit{Effect of Phenylalanine, Retinoic Acid, and 4-diethylaminobenzaldehyde on Proliferation of O9-1 Mouse Cranial Neural Crest Cells} \textbf{Nikki Seagraves}, Michaela Vance, Nazka Nurbyeck, Kayley Pate, Gabriella Smith, Mckayla Muse (University of Central Oklahoma, USA)

\textbf{320 B6} \textit{Epithelial cell dynamics during small intestinal elongation} \textbf{Sha Wang}\textsuperscript{1}, Deborah Gumucio\textsuperscript{2}, Terry Lechler\textsuperscript{1} (\textsuperscript{1}Duke University, USA; \textsuperscript{2}University of Michigan, USA)

12:00 pm \textbf{Group C} (Theme: Cell Adhesion, Migration and Guidance)

\textbf{339 C1} \textit{Investigating the relationship between epithelial cell reintegration and the cell cycle} \textbf{Qingyuan Jia}\textsuperscript{1}, Nicole Dawney\textsuperscript{1}, Christian Cammarota\textsuperscript{2}, Dan Bergstralh\textsuperscript{1,2} (\textsuperscript{1}Department of Biology, University of Rochester, NY, United States; \textsuperscript{2}Department of Physics & Astronomy, University of Rochester, NY, United States)

\textbf{340 C2} \textit{Cis-clustering of Cdh3 is required for convergent extension.} \textbf{Sena Sarikaya}, Robert J. Huebner, Abdul Naseer Malmi-Kakkada, Shinuo Weng, Dave Thirumalai, John B. Wallingford (The University of Texas at Austin, USA)

\textbf{341 C3} \textit{Cell shape remodeling and phenotypic plasticity during extravasation in the larval zebrafish} \textbf{Maria J. Gacha-Garay}, Qinyun Zhao, Robert Morabito, Benjamin Martin (Stony Brook University, United States of America)

\textbf{342 C4} \textit{A mutation in the histone modification reader, Yeats2, results in defective collective cell migration in the zebrafish embryo} \textbf{Hillery McGraw}, Jon Bell (University of Missouri-Kansas City, USA)

\textbf{343 C5} \textit{Endothelial sema3fb regulates angiogenic sprouting} \textbf{Charlene Watterston}\textsuperscript{1,2}, Ramy Halabi\textsuperscript{2,3}, Carrie Herr\textsuperscript{3}, Sarah McFarlane\textsuperscript{2,3}, Sarah J Childs\textsuperscript{1,2} (\textsuperscript{1}Department of Biochemistry and Molecular Biology,
University of Calgary, CA; Alberta Children’s Hospital Research Institute, Canada; Department of Cell Biology and Anatomy, Hotchkiss Brain Institute, University of Calgary, Canada)

Zebrafish melanoma cells form focal adhesion-like structures during single cell migration in vivo Qian Xue, James Carrington, Minna Roh-Johnson (Department of Biochemistry, University of Utah, United States)

12:30 pm Break

Live Q&A Poster Session 14

11:00 am Group A (Theme: Morphogenesis)

A mechano-molecular insight into the process of forebrain roof plate invagination Mohd Ali Abbas Zaidi¹, Sourav Halder², Sumit Basu¹, Jonaki Sen¹ (¹INDIAN INSTITUTE OF TECHNOLOGY KANPUR, IN; ²NORTHWESTERN UNIVERSITY ILLINOIS, USA)

The Hedgehog effector Netrin regulates optic fissure and stalk morphogenesis Sarah Lusk, Hannah Gordon, Kristen Kwan (University of Utah, USA)

Retinoic acid controls endothelial progenitor migration and trunk vasculogenesis via somite maturation Eric Paulissen¹, Tianying Chen², Benjamin L. Martin¹ (¹Stony Brook University, USA; ²Yale University, USA)

The EMT transcriptional regulator Snai1 promotes myocardial integrity by regulating intermediate filament organization in zebrafish Alessandra Gentile, Felix Gunawan, Anabela Bensimon-Brito, Rashmi Priya, Hans-Martin Maischein, Sylvia Jeratsch, Janett Piesker, Stefan Günther, Johannes Graumann, Didier Stainier (Max Planck Institute for Heart and Lung Research, DE)

Zebrafish notochord elongation requires the activation of matrix metalloproteinase 2 mediated by serine proteases. Rachael Wyatt (University of New Brunswick, CA)

11:30 am Group B (Theme: Cell Fate Specification and Differentiation)

Spatiotemporal regulation of thyroid hormone signaling specifies cone subtypes in human retinal organoids Christina McNerney, Robert J. Johnston Jr (Johns Hopkins University, USA)

Molecular characterization of retinal ganglion cell subtypes in human retinal organoids. Brian Guy (Johns Hopkins University, USA)

Novel regulatory role of miR-124 on mesodermal cell specification Kalin Konrad¹, Santiago Suarez², Jia Song¹ (¹University of Delaware, USA; ²Regeneron Pharmaceuticals, Inc., USA)

The amino acid transporter Slc38a2/SNAT2 provides proline to fulfill energetic and biosynthetic demands during osteoblast differentiation. Leyao Shen, Yilin Yu, Courtney Karner (Duke University, United States)

A Previously Uncharacterized Connexin Mediates Early Muscle Differentiation Rachel Lukowicz¹, Anisha Adke¹, Adam Miller¹ (¹University of Oregon, USA; ²University of Minnesota, USA)

gata5/6 broadly regulate the early specification of mesodermal lineages Mengyi Song¹,²,³, Xuefei Yuan¹,²,³, Claudia Racioppi⁴, Anastasiia Aleksandrova⁴, Meaghan Leslie¹,³, Lionel Christiaen⁴, Michael Wilson²,³, Ian Scott¹,³ (¹Developmental and Stem Cell Biology, Sickkids, Canada; ²Genetics and Genome Biology, Sickkids, Canada; ³Department of Molecular Genetics, University of Toronto, Canada; ⁴Center for Developmental Genetics, Department of Biology, New York University, United States)

12:00 pm Group C (Themes: Cell Fate Specification and Differentiation; Neural Development and Patterning)
Ventral tissue fate in Drosophila leg is controlled in part by three distinct actions of the selector gene midline Lindsay Phillips, Pia C Svendsen, Jae-Ryeon Ryu, William J Brook (University of Calgary, CA)

OCT4 labels two distinct stem cell types in somatic cell reprogramming Alexandra Moauro, Anthony Parenti, PhD (Michigan State University, USA)

The ETS Transcription Factor ERF is a Gatekeeper of Naïve Pluripotency Maria Vega Sendino, Teresa Olbrich, Catherine N. Domingo, Mariajose Franco, Desiree Tillo, Peter C. FitzGerald, Andy D. Tran, Michael J. Kruhlak, Sergio Ruiz (1Laboratory of Genome Integrity, CCR, NCI, NIH, USA; 2Genetics Branch, CCR, NCI, NIH, USA; 3Genome Analysis Unit, CCR, NCI, NIH, USA; 4Laboratory of Cancer Biology and Genetics, CCR, NCI, NIH, USA)

The Effects of the Deletion of BRCA-Associated Protein 1(BAP1) From the Skin Epidermis Sarah Ann King (University of Chicago, USA)

Brain Games: The Interplay Between Neural Stem Cells and Vascular Cells During Mouse Cortical Development Jeremy Martin, Kayla M. Michelson, Bony De Kumar, Danielle S. Perley, Diane C. Darland (1University of North Dakota, Department of Biology, USA; 2University of North Dakota, School of Medicine & Health Sciences, Department of Biomedical Sciences, USA)

Deciphering the role of CNKSR2 in the developing chick forebrain. Niveda Udaykumar, Mohd. Ali Abbas Zaidi, Jonaki Sen (Indian Institute of Technology Kanpur, IN)

12:30 pm Break

Live Q&A Poster Session 15

11:00 am Group A (Theme: Genetic Models of Disease)

Investigating the role for motile ciliated cell lineages in spine morphogenesis Anne Meyer-Miner, Katrin Henke, Matthew Harris, Brian Ciruna (1Developmental & Stem Cell Biology Program, SickKids Research Institute, Canada; 2Harvard Medical School, Department of Genetics, Boston Children's Hospital, United States)

Pathogenic human variants in KIAA0753 eliminate primary ciliogenesis and Sonic Hedgehog signaling in vitro Katherine Inskeep, K. Nicole Weaver, Yuri Zarate, Rolf Stottmann (1Cincinnati Children's Hospital, USA; 2Arkansas Children's Hospital, USA)

Systematic analysis of ciliary Hedgehog signaling in immortal cell lines and human fibroblasts Arianna Gomez, Julie Van De Weghe, Malaney Finn, Caitlin Miller, Dan Doherty (1University of Washington, Department of Pediatrics, Genetic Medicine Division, USA; 2University of Washington, Molecular Medicine and Mechanisms of Disease PhD Program, USA)

A Novel Role for DYRK1A in Kidney Development Alexandria Blackburn, Nasim Bekheirnia, Pierre D. McCrea, Mir Reza Bekheirnia, Rachel Miller (1Department of Pediatrics, Pediatric Research Center, UTHealth McGovern Medical School, United States; 2The University of Texas MD Anderson Cancer Center UTHealth Graduate School of Biomedical Sciences, Program in Genetics and Epigenetics, United States; 3Renal Section, Department of Pediatrics, Baylor College of Medicine, United States; 4Center for Reproductive Medicine, Baylor College of Medicine, United States; 5Texas Children's Hospital, United States; 6Department of Molecular and Human Genetics, Baylor College of Medicine, United States; 7Department of Genetics, The University of Texas MD Anderson Cancer Center, United States; 8The University of Texas MD Anderson Cancer Center UTHealth Graduate School of Biomedical Sciences, Program in Biochemistry and Cell Biology, United States)

Odd-Skipped Related 1 (Osr1) Regulates Extracellular Matrix Deposition During Bladder Development and Disease Vasikar Murugapoopathy, Philippe Cammisotto, Laura Curran, Lysanne Campeau, Samuel David, Indra Gupta (1McGill University, CA; 2McGill University Health Center, CA; 3Jewish General Hospital, CA; 4Montreal General Hospital, CA)

11:30 am Group B (Theme: Genetic Models of Disease)
327 B1 Gene dosage and environmental factors modulate phenotype variability in congenital anomalies Sharien Fitriasari, Anne Tjaden, Paul Trainor (Stowers Institute for Medical Research, USA)

328 B2 Suture involvement in midface hypoplasia and Bmp7's role Daniela Roth, Pranidhi Baddam, Daniel Graf (School of Dentistry, University of Alberta, Canada)

329 B3 Fgf8 dosage levels contribute to asymmetries in jaw and pharyngeal pouch development Nathaniel Zbasnik, Jennifer Fish (Umass Lowell, USA)

330 B4 Wnt Signaling Control of Secondary Palatogenesis Illuminated by Single-cell Transcriptomes Kurt Reynolds, Shuwen Zhang, Bo Sun, Yu Ji, Michael Garland, Saharul Islam, Chengji Zhou (University of California, Davis, USA)

331 B5 A zebrafish model of ALX-linked frontonasal dysplasia Baul Yoon, Lauren Bluhm, Janina Kueper, Pan Yeung, Kenta Kawasaki, Eric C. Liao, Yevgenya Grinblat (University of Wisconsin, Madison, USA; Massachusetts General Hospital, Harvard Medical School, and Shriners Hospital for Children, Boston, USA)

332 B6 Modeling Cerebro-costo-mandibular syndrome (CCMS) in mouse by mutating Snrpb to understand its role in craniofacial development Sabrina Alam, Jacek Majewski, Loydie Majewska (Human Genetics, McGill University, CA; RI-MUHC, McGill University, CA; McGill University and Genome Quebec Innovation Centre, CA; Department of Pediatrics, McGill University, CA)

12:00 pm Group C (Theme: Genetic Models of Disease)

351 C1 Global process, tissue-specific defects: The role of RNA Polymerase I during cranial neural crest development Karla Terrazas-Falcon, Kristin Watt, Soma Dash, Annya Achilleos, Emma Moore, Ruoran Zhao, Jay Unruh, Dai Tsuchiya, Paul Trainor (Stowers Institute for Medical Research, USA; The University of Kansas School of Medicine, USA; Baylor College of Medicine, USA)

352 C2 Neural Crest Specific Deletion of Mouse Sf3b4 Leads to Abnormal Craniofacial Phenotype Shruti Kumar, Sabrina Alam, Marie-Claude Beauchamp, Jacek Jerome-Majewska, Loydie Jerome-Majewska (McGill University, CA; Research Institute of the McGill University Health Centre, CA)

353 C3 Knockdown of hspg2 in zebrafish is associated with mandibular jaw joint fusion and neural crest cell dysregulation Barbara Castellanos, Anita Quintana (The University of Texas at El Paso, USA)

354 C4 The development of vascular malformations in a RASA1 Capillary Malformations-Arteriovenous Malformations (CM-AVM) zebrafish model. Jasper Greysson-Wong, Jae-Ryeon Ryu, Sarah Childs (University of Calgary, Canada)

355 C5 Determine the Effect of an Early-Onset Atrial Fibrillation-Associated TTN Missense Mutation on Cardiac Development and Function Xinghang Jiang, Fritz Navales, Aylin Ornelas-Loredo, Faisal Darbar, Denise Mol, Brandon Chalazan, Victor Qiao, Zain Alzahrani, Dawood Darbar, Ankur Saxena (Department of Biological Sciences, University of Illinois at Chicago, USA; Department of Medicine, University of Illinois at Chicago, USA)

356 C6 The role of collagen 11a2 in zebrafish vertebral development Denise Rebello, Brian Ciruna (University of Toronto, CA; The Hospital for Sick Children, CA)

12:30 pm Break

Live Q&A Poster Session 16

11:00 am Group A (Themes: Development and Evolution; Molecular Medicine, Cancer, and Development)

309 A1 Grhl3 regulates lamellipodia in the non-neural ectoderm during neural tube closure Eric Jaffe, Lee Niswander (UC-Denver AMC, USA; UC-Boulder, USA)

310 A2 Deciphering the regulatory code driving neural crest evolution and development Mayur Prag, Tatjana Sauka-Spengler, Marianne Bronner, Dorit Hockman (University of Cape Town,ZA; University of Oxford, UK; California Institute of Technology, USA)

311 A3 Gene regulatory network evolution during Drosophila melanogaster and Aedes aegypti nervous system
Cartilage proteoglycans inhibit BMP-mediated bone formation Elham Koosha, Brian F. Eames (Department of Anatomy, Physiology, and Pharmacology (APP), College of Medicine, University of Saskatchewan, Saskatoon, SK S7N 5E5, CA)

Intracisternal administration of tanshinone IIA-loaded nanoparticles leads to reduced tissue injury and functional deficits in a porcine model of ischemic stroke. Elizabeth Waters1,2,3, Erin Kaiser1,2,3, Xueyuan Yang4, Madison Fagan1-3, Kelly Scheulin1-3, Julie Jeon5, Soo Shin1-3, Holly Kinder1-2,3, Anil Kumar4, Simon Platt1,6, Kylene Jo Duberstein1,2,3, Hae Jin Park5, Jin Xie1,4, Franklin West1,2,3,7 (1Regenerative Bioscience Center, University of Georgia, USA; 2Biomedical Health and Sciences Institute, University of Georgia, USA; 3Department of Animal and Dairy Science, College of Agricultural and Environmental Sciences, University of Georgia, USA; 4Department of Chemistry, Franklin College of Arts and Sciences, University of Georgia, USA; 5Department of Foods and Nutrition, College of Family and Consumer Sciences, University of Georgia, USA; 6Department of Small Animal Medicine and Surgery, College of Veterinary Medicine, University of Georgia, USA; 7Interdisciplinary Toxicology Program, College of Pharmacy, University of Georgia, USA)

Co-option of a developmental transcriptional circuit driving cell migration by neural crest-derived cancer Debadrita Bhattacharya (Cornell University, USA)

11:30 am Group B (Theme: Patterning Embryo Development)

E-cadherin-mediated Cell Contacts Underlie Epithelial Symmetry Breaking in vivo Victor Naturale, Jessica Feldman (Stanford University, USA)

Post-transcriptional tuning of signaling gradients mediates ectodermal patterning Jacqueline Copeland (Cornell University, USA)

Molecular basis of synovial joint site specification in a developing chick limb Upendra Yadav1, Pratik Singh2, Amitabha Bandyopadhyay1 (1Indian Institute of Technology Kanpur, IN; 2Dana-Farber Cancer Institute, Boston, MA, United States)

Alternative polyadenylation of the Hes7 3'UTR is required for proper segmentation Kara Braunreiter, Jill Teitelbaum, Riley Ogreau, Susan Cole (The Ohio State University, USA)

In vitro characterization of the human segmentation clock Margarete Diaz Cuadros1,2, Daniel Wagner1, Christoph Budjan1-2, Alexis Hubaud1-2, Oscar Tarazona1,2, Sophia Donnelly1,2, Arthur Michaut1,2, Ziad al Tanoury1,2, Kumiko Yoshioka-Kobayashi3, Yusuke Niino4, Ryoichi Kageyama2, Atsushi Miyawaki5, Jonathan Touboul6, Olivier Pourique1,2,6 (1Harvard Medical School, USA; 2Brigham and Women’s Hospital, USA; 3Kyoto University, Japan; 4RIKEN Center for Brain Science, Japan; 5Brandeis University, USA; 6Harvard Stem Cell Institute, USA)

12:00 pm Group C (Themes: Patterning Embryo Development; Morphogenesis)

Patterning the embryonic pulmonary mesenchyme Katharine Goodwin, Celeste M. Nelson (Princeton University, USA)

Non-canonical Fz1/2/7 and Nodal signaling cooperate to initiate the specification of dorsal territories in seaurchin embryos Marina Martinez Bartolome (Auburn University, USA)

microRNA-31 regulates skeletogenesis by direct suppression of Eve and Wnt1 Nina Faye Sampilo1, Nadezda Stepicheva2 (1University of Delaware, USA; 2University of Pittsburgh School of Medicine, USA)

BMP signaling gradient interpreted through concentration thresholds in dorsal-ventral axial patterning Hannah Greenfeld, Jerome Lin, Mary Mullins (University of Pennsylvania, USA)

Shining a light on ciliary signaling: The role of ciliary cAMP in Hedgehog-dependent fate specification Melissa Truong1, Sara Bilekova1, Semil Choksi1, Wan Li3, Lukasz Bugaj2, Ke Xu3, Jeremy Reiter1 (1University of California, San Francisco, USA; 2University of Pennsylvania, USA; 3University of California, Los Angeles, USA)
In vivo and in toto imaging for the reconstruction of multilevel dynamics  Svetlana Jovanic, Thierry Savy, Nadine Peyrieras (BioEmergences, CNRS FRE2039, Gif-sur-Yvette, France)

12:30 pm Break

Live Q&A Poster Session 17

1:00 pm Group A (Theme: Computation and Modeling of Cell and Tissue Behavior)

A2 Mechanics of Cell Packing in the Notochord Sharon Lubkin, Emma Sorrell (North Carolina State University, USA)

A3 A novel microsphere-based cell tagging method for large-scale tissue flow mechanics in embryos and animals Vivek Nagendra Prakash1, Lisandro Maya-Ramos3, Rieko Asai3, Takashi Mikawa3, Manu Prakash2 (1University of Miami, USA; 2Stanford University, USA; 3University of California, San Francisco, USA)

A4 The SensorOverlord predicts the accuracy of measurements with ratiometric biosensors Julian Stanley, Sean Johnsen, Javier Apfeld (Northeastern University, USA)

A5 Mechanochemoal symmetry breaking during morphogenesis of lateral-line sensory organs Adrian Jacobo1, Anna Erzberger1, Agnik Dasgupta1, Kimberly Siletti1,2, A. James Hudspeth1 (1Howard Hughes Medical Institute and Laboratory of Sensory Neuroscience, The Rockefeller University, USA; 2Department of Medical Biochemistry and Biophysics, Karolinska Institutet, Sweden)

1:30 pm Group B (Themes: Gene Regulation and Chromosome Topology; Neural Development and Patterning)

B1 Investigating the Effects of Histone H3.3 Point Mutations in Neural Crest Cells and Craniofacial Development Nadine Nzirorera1,2, Loydie Majewska1,2, Nada Jabado1,2 (1McGill University, CA; 2McGill University Health Center, CA)

B2 To transcribe or not to transcribe: How HoxB coding and non-coding RNA transcripts are regulated by enhancer elements Zainab Afzal1,2, Bony De Kumar1, Christof Nolte1, Jeffrey Lange1, Sean McKinney1, Brian Slaughter1, Jay Unruh1, Ariel Paulson1, Robb Krumlauf1,2 (1Stowers Institute for Medical Research, USA; 2Department of Anatomy and Cell Biology, Kansas University Medical Center, USA)

B3 A roadmap of ribosome heterogeneity and its impact on cellular differentiation Naomi Genuth, Zhen Shi, Rachel Shulman, Irving Weissman, Kyle Loh, Maria Bara (Stanford University, USA)

B4 Using an RNA-guided DNA binding platform to study transcriptional corepressor specificity across the Drosophila melanogaster genome Ana-Maria Raicu (Michigan State University, USA)

B5 Regulatory roles of microRNAs in early development Jia Song (University of Delaware, USA)

B6 Unique homeobox codes delineate all neuron classes of the nematode Caenorhabditis elegans Molly Reilly, Oliver Hobert (Columbia University, USA)

2:00 pm Group C (Theme: Morphogenesis)

C1 The Vangl2 interactome during convergent extension reveals complex linkages to the actin and septin cytoskeletons Caitlin Devitt, Chanjane Lee, Ophealia Papoulas, Rachael Cox, Edward Marcotte, John B. Wallingford (University of Texas, USA)

C2 Glypican4 regulates planar cell polarity of endoderm cells by controlling N-cadherin localization Anurag Kakkerla Balaraju, Bo Hu, Matthew Murry, Juan Rodriguez, Fang Lin (University of Iowa, USA)

C3 Perivascular Sonic hedgehog signaling regulates microvascular patterning and stability in cleft lip pathogenesis Miranda Sun, Hannah Chung, Veronika Matsuk, Dustin Fink, Robert Lipinski (University of Wisconsin-Madison, United States of America)

C4 Mapping the relationship between proliferation and morphology in the mouse face Rebecca M. Green1, Si Han Guo1, Lucas Lo Vercio1, Andreas Dauter1, Marta Marchini1, Xhang Zhao1, Ralph Marcucio2
Benedikt Hallgrimsson\textsuperscript{1} (\textsuperscript{1}University of Calgary, CA; \textsuperscript{2}University of California San Francisco, USA)

**412  C5**  
Sonic Hedgehog Regulation of Frem1 in the Cranial Neural Crest Mesenchyme and Midfacial Development  
Matthew McLaughlin, Miranda Sun, Robert Lipinski (University of Wisconsin - Madison, United States of America)

**413  C6**  
Differences between natural pregnancy and diapause: a cautionary tale  
Hannah Lufkin, Zachary Raider, Diana Flores, Anna Coronel, Ripla Arora (Michigan State University, USA)

12:30 pm  
**Break**

### Live Q&A Poster Session 18

**1:00 pm**  
**Group A** (Themes: Morphogenesis; Patterning Embryo Development)

**367 A1**  
Hox genes coordinate adult tissue segmentation and behavior to regulate asexual reproduction  
Christopher Arnold\textsuperscript{1}, Analí Migueles Lozano\textsuperscript{1}, Jeffrey Lange\textsuperscript{1}, Alejandro Sánchez Alvarado\textsuperscript{1,2} (\textsuperscript{1}Stowers Institute, USA; \textsuperscript{2}HHMI, USA)

**368 A2**  
How hierarchical protein pattern formation couples cell shape information to biochemical dynamics  
Tzer Han Tan\textsuperscript{1}, Manon Wigbers\textsuperscript{2}, Fridtjof Brauns\textsuperscript{2}, S. Zachary Swartz\textsuperscript{3}, Erwin Frey\textsuperscript{2}, Nikta Fakhri\textsuperscript{4} (\textsuperscript{1}Department of Physics, Massachusetts Institute of Technology, USA; \textsuperscript{2}Department of Physics, Ludwig-Maximilians-Universität München, Germany; \textsuperscript{3}Whitehead Institute for Biomedical Research, USA)

**369 A3**  
Thyroid hormone mediates proximo-distal patterning in zebrafish fin skeleton.  
Yinan Hu, Melody Harper, Benjamin Acosta, Joan Donahue, Hyungwoo Lee, Hoa Bui, Sarah McMenamin (Boston College, USA)

**370 A4**  
Insights into BMP-mediated patterning with in vivo optogenetics  
Katherine Rogers\textsuperscript{1}, Mohammad ElGamacy\textsuperscript{1}, Benjamin Jordan\textsuperscript{2}, Patrick Müller\textsuperscript{1} (\textsuperscript{1}Friedrich Miescher Laboratory of the Max Planck Society, Germany; \textsuperscript{2}Harvard University, USA)

**371 A5**  
A multicellular crosslink of genetic networks underlying robust tissue patterning of cells in vertebrate embryos  
Muhammed Simsek, Didar Sapaarov, Oriana Zinani, Ertugrul M. Ozbudak (Cincinnati Children's Hospital, USA)

**372 A6**  
Investigating the role of the Planar Cell Polarity Pathway during kidney development in zebrafish  
Jessa Westheimer, Joshua A. Moore, Rosa A. Uribe (Rice University, United States)

**1:30 pm**  
**Group B** (Theme: Emerging Research Organisms)

**390 B1**  
Observing wound healing in Clytia hemisphaerica muscle-like cells.  
Elizabeth Lee (University of Chicago, USA)

**391 B2**  
Description of serotonin-LIR and SCPb-LIR in the juvenile nervous system of Berghia stephanieae  
Carl Whitesel, Hereroa Johnston, Deirdre Lyons (UC San Diego, Scripps Institution of Oceanography, United States)

**392 B3**  
Developing Genetic Tools to Establish Biomphalaria glabrata as a Model Organism  
Davoneshia Lollis, Heather Tsong, Maura Boerio, Wesley Chou, Daniel Wagner (Rice University, United States of America)

**393 B4**  
Development of pouch young of the sugar glider (Petaurus breviceps), a novel marsupial model organism  
Bruce Ostrow (Grand Valley State University, USA)

**394 B5**  
Size and shape control in an early diverging animal  
Pranav Vyas (Stanford University, United States)

**395 B6**  
Genetic Knockout of pigmentation in the squid Doryteuthis pealeii  
Karen Crawford\textsuperscript{1,2}, Caroline Albertin\textsuperscript{2}, Juan Diaz Quiroz\textsuperscript{2}, Namrata Ahuja\textsuperscript{2}, Kristen Koenig\textsuperscript{3}, Joshua Rosenthal\textsuperscript{2} (\textsuperscript{1}St Mary's Col of Maryland, USA; \textsuperscript{2}The Marine Biological Laboratory, USA; \textsuperscript{3}Harvard University, USA)

**2:00 pm**  
**Break**

### Live Q&A Poster Session 19
1:00 pm **Group A** (Themes: Intracellular Signaling Pathways; Tissue Engineering)

**A1** Decreased levels of miR-28 and miR377 in hyperglycemic conditions demonstrate low mineralization in mESCs

Ariana Hardy, Omran Karmach, Nicholas Ventura, Dorota Kaniowska, Steven Sera, Devon D. Ehnes Ehnes, Dr. Nicole zur Nieden (University of California, Riverside, USA; Translational Center for Regenerative Medicine, Germany)

**A2** Female-specific upregulation of insulin pathway activity mediates the sex difference in Drosophila body size plasticity

Jason Millington, Chien Chao, Ziwei Sun, Paige Basner-Collins, George Brownrigg, Lianna Wat, Bruno Hudry, Irene Miguel-Aliaga, Elizabeth Rideout (The University of British Columbia, Canada; Imperial College London, United Kingdom; Universite Nice Sophia Antipolis, France)

**A3** Adipose mitochondrial metabolism couples nutrients to systemic insulin signaling and growth

Shrivani Pirahas, Joel Chahal, Erin Thorson, Michael Turingan, Savraj Grewal (University of Calgary, CA)

**A4** Sensory Sensitivity in a Developmental Genetic Disorder: Association of Tactile and Auditory Sensitivity with Autism Traits in Cornelia de Lange Syndrome.

Yoel Selassie, Masoud Salehi, Audrey Chang, Jannah Bukhari, Siddharth Srivastava, Marco Grados (Johns Hopkins University, United States; National Institute of Health, United States; University of Maryland, United States; Harvard Medical School, United States)

**A5** TAEL 2.0: An improved optogenetic gene expression system for zebrafish

Jesselynn LaBelle, Adela Ramos-Martinez, Kyle Shen, Stefan Materna, Stephanie Woo (Department of Molecular Cell Biology, University of California Merced, USA; California State University Stanislaus, USA)

1:30 pm **Group B** (Theme: Organogenesis)

**B1** Embryonic formation of the cardiac jelly extracellular matrix assists in providing mechanical cues for proper heart development

Paige Ostwald, Neha Ahuja, Brandon Hylton, Deborah Garrity (Colorado State University, USA)

**B2** The developing epicardium sustains cardiac chamber morphogenesis

Giulia Boezio, Josephine Gollin, Nana Fukuda, Felix Gunawan, Didier Stainier (Max Planck Institute for Heart and Lung Research, DE; Smith College, Northampton, US)

**B3** Identification of a role for RA in hepatic patterning and induction in the mouse.

Taylor Guertin, Iana Garcia, Amrita Palaria, Paul A. Trainor (University of Massachusetts Amherst, USA; Stowers Institute for Medical Research, USA)

**B4** The Kinesin-9 Family: Non-Canonical Motile Ciliary Kinesins

Mia Konjkusic (University of Texas, Austin, USA)

**B5** The role of Ankr11, a KBG syndrome risk gene, in cardiovascular development

Yana Kibalnyk, Pranidhi Baddam, Daniela Roth, Dylan Terstege, Jonathan Epp, Daniel Graf, Anastassia Voronova (University of Alberta, CA; University of Calgary, CA)

**B6** Iroquois homeobox genes Irx1 and Irx2 play essential and overlapping roles in mammalian embryonic development

Sepideh Sheybani-Delolui, Lijun Chi, Lijuan Hu, Qiongjing Yuan, Leo Xu, Weifan Liu, Rong Mo, Xiaoyun Zhang, Paul Delgado-Olguin, Chi-Chung Hui (The Hospital for Sick Children, CA; University of Toronto, CA)

2:00 pm **Group C** (Theme: Organogenesis; Germ Cells and Gametogenesis)

**C1** A dynamic cell recruitment process drives growth of the Drosophila wing by overscaling the vestigial expression pattern

Luis Muñoz Nava, Hugo Ariel Alvarez, Marycruz Flores Flores, Osvaldo Chara, Marcos Nahmad (Center for Research and Advanced Studies of the National Polytechnical Institute (Cinvestav-IPN), Mexico; Institute of Physics of Liquids and Biological Systems (IFLYSIB), National Scientific and Technical Research Council (CONICET) and University of La Plata (UNLP), La Plata, Argentina; Department of Biological Sciences, Faculty of Exact Sciences, University of La Plata (UNLP), La Plata, Argentina; Center for Information Services and High Performance Computing (ZIH), Technische Universität at Dresden (TUD), Dresden, Germany)
Exposure to the ubiquitous herbicide atrazine causes defects in intestinal morphogenesis
Julia Grzymkowski, Nanette Nascone-Yoder (North Carolina State University, USA)

A non-proteolytic requirement for a single proteasomal lid subunit, RPN-12, in C. elegans germline sex determination and oogenesis
Lourds Fernando, Anna Allen (Howard University, USA)

The role of RACK-1 in regulating stem cell proliferation in the C. elegans germ line.
Kara Vanden Broek¹, Chris Wang², Dave Hansen¹ (¹University of Calgary, CA; ²Ambrose University, CA)

Germ plasm localized RNAs are conserved across Danionin fish embryogenesis
Christina Hansen, Jacob Kurek, Trevor Chamberlain, Francisco Pelegrí (University of Wisconsin - Madison, USA)

Serotonylated proteins in mammalian spermatozoa: intracellular visualization and possible functions
Alexander Shitikov¹,², Tatiana V. Zinevich³, Elena E. Voronezhskaya¹, Victoria Melnikova¹ (¹Koltsov Institute of Developmental Biology RAS, Russia; ²Dept of Embryology, Faculty of Biology, Moscow State University, Russia; ³Lab of Bioorganic Chemistry, Faculty of Biology, Moscow State University, Russia)

Live Q&A Poster Session 20

1:00 pm Group A (Theme: Cell Fate Specification and Differentiation)

378 A1 Transcription Factor 21 Controls Nephron Progenitor Cells and Podocyte Development through regulation of Wnt/β-catenin signaling
Gal Finer¹,², Tomoko Hayashida¹,², Tomokazu Suma³, Xiangmin Zhao¹,², Tuncer Onay³, Yoshiro Maezawa³, Susan Quaggin¹ (¹Northwestern University, United States; ²Ann & Robert H. Lurie Children's Hospital of Chicago, United States; ³Duke University, United States; ⁴Chiba University, Japan)

379 A2 Microenvironment- and cell type-specific functions of core gene regulatory network component, FOXD3, in human germ layer development and neuroblastoma
Brigitte Arduini, Don R. Stimpson, Katherine C. Marciano, Yang Bai, Deanna M. Thompson (Rensselaer Polytechnic Institute, USA)

380 A3 The Development of Neural Crest Cells and Chromatophores in Agalychnis callidryas
Alesi Monterroso, Alyssa Guerrero, Akshaya Venkatash, Desiree Perez, Maria de Bellard (California State University, Northridge, United States)

381 A4 Srcap-mediated H2A.Z localization is required for zebrafish neural crest cell differentiation
Fanju Meng, Patrick Murphy (University of Rochester, USA)

382 A5 Profiling genes regulated by the neural crest-essential methyltransferase NSD3
Bridget Jacques-Fricke¹, Juliane Roffers-Agarwal², Micah D. Gearhart², Laura S. Gammill² (¹Hamline University, USA; ²University of Minnesota, USA)

383 A6 Deregulation of fibroblast growth factor, insulin and folate signaling mediates hypomineralization associated with tobacco exposure
Madeline Vera-Colón, Nicole Sparks, Omran Karmarch, Lauren Walker, Nicole zur Nieden (University of California, Riverside, USA)

1:30 pm Group B (Theme: Cell Fate Specification and Differentiation)

402 B1 C. elegans establishes germline versus soma by balancing inherited histone methylation
Brandon Carpenter (Emory University, USA)

403 B2 Unraveling the molecular pathways that drive oligodendrocyte fate specification in the developing cerebral cortex using single-cell RNA sequencing
Caitlin Winkler, Santos Franco (University of Colorado, USA)

404 B3 The complex Nuclear Receptor Element (cNRE) is necessary and sufficient to drive the atrial expression in mice and zebrafish
Luana Santos¹,²,³, Angela Saito², Angela Maria Sousa Costa², Mirana Ramialison³, José Xavier Neto⁴ (¹University of Sao Paulo, BR; ²Brazilian Biosciences National Laboratory , BR; ³Australian Regenerative Medicine Institute, AUS; ⁴Federal University of Ceará , BR)

405 B4 Identifying Gene Targets of Retinoic Acid During Retinal Neurogenesis
Raina Sacksteder, Margalit Leiser, Gwen Miller, Kara Cerveny (Reed College, United States)
Investigating the cis-regulatory logic that underlies horizontal cell fate specification in the developing retina

Estie Schick¹, Kevin C. Gonzalez², Kazi Hossain³, Pooja Dutta³, Twinkle Jacob², Mark M. Emerson¹,² (¹CUNY Graduate Center, USA; ²The City College of New York, USA)

Inhibitor-of-Differentiation 4 (Id4): a dominant-negative helix-loop-helix transcription factor with dose-dependent effects on inner ear hair cell differentiation

Nicolas Daudet, Sara Weber, Ruth Moon, Miriam Gomez, Zoe Mann, Magdalena Zak (University College London, GB)

Prenatal FGFR2 signaling is required for postnatal PDGFRα+ myofibroblast differentiation and function during secondary septation

Matthew Riccetti¹,², Jenna Green², Anne Karina T. Perl¹,²,³ (¹Molecular and Developmental Biology Graduate Program, Cincinnati Children’s Hospital Medical Center, Cincinnati, OH, United States; ²Division of Pulmonary Biology, Cincinnati Children’s Hospital Medical Center, Cincinnati, OH, United States; ³Department of Pediatrics, University of Cincinnati College of Medicine, Cincinnati, OH, United States)

Identification of Signaling Pathway Genes Expressed During Axolotl Taste Bud Development

Deborah Eastman, Lauren Marazzi, Priya Kohli, Tiara Jennings (Connecticut College, USA)

Pou4-2 function is required for mechanosensory neuron differentiation in planarians

Ryan McCubbin, Shengzhou Wang, Kelly Ross, Ricardo Zayas (San Diego State University, USA)

Phosphatidic acid promotes ectopic Notch signaling by affecting Sanpodo and receptor trafficking during development of the sensory organ of D. melanogaster

Ignacio Medina-Yáñez¹,², Franco Vega-Macaya¹,², Gonzalo H. Olivares¹,², Patricio Olguín¹,² (¹Biomedical Neuroscience Institute, Department of Neuroscience, Facultad de Medicina, Universidad de Chile, Chile; ²Program of Human Genetics, ICBM, Facultad de Medicina, Universidad de Chile, Chile)

Coordinated loss of cilia during Xenopus development

Rosa Ventrella, Sun Kim, Brian Mitchell (Northwestern University, USA)

daf-16/FOXO acts via lin-41 to block adult cell fate in C. elegans dauer larvae

Allison Cale¹, Matthew J. Wirick¹, Amelia F. Alessi², Mallory A. Freeberg², Isaac T. Smith¹, Kyal Lalk¹, Mikayla N. Schmidt¹, Megan Wood¹, Liberta Cuko¹, Benjamin Olson¹, Kevin Ranke¹, Axel Schmitter¹, John K. Kim², Xantha Karp¹ (¹Central Michigan University, United States; ²Johns Hopkins University, United States)

Forebrain malformations resulting from Sox10cre-mediated cell autonomous Hedgehog pathway modulation: new roles for the neural crest in CNS morphogenesis

Jocelyn Cao, Austin Steward, Robert Lipinski (University of Wisconsin-Madison, Department of Comparative Biosciences, United States of America)

ak33 Controls Mediolateral Patterning in Zebrafish Frontonasal Skeleton.

Jennyfer Mitchell, Juliana Sucharov, Elliot Brooks, Austin Guillen, James Nichols (University of Colorado Anschutz Medical Campus, USA)

Spatial and temporal changes in EMT underlie evolution of cnidarian gastrulation

Yulia Kraus¹,², Igor Kosevich¹, Tatiana Bagaeva³, Evelyn Houliston⁴ (¹Lomonosov Moscow State University, Faculty of Biology, Russia; ²Koltsov Institute of Developmental Biology, RAS, Russia; ³University of Vienna, Department for Molecular Evolution and Development, Austria; ⁴Sorbonne University, CNRS, Laboratory of Developmental Biology, Villefranche-sur-mer, France)

Intracellular serotonin as a regulator of morphogenetic movements in a gastropod mollusk

Anton Bogomolov¹, Alexander Yaksheff¹,², Elena E. Voronezhskaya¹ (¹Koltsov Institute of Developmental Biology Russian Academy of Sciences, Russia; ²Skolkovo Institute of Science and Technology, Russia)
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<tr>
<td>435</td>
<td>A5</td>
<td>Regulated Sonic hedgehog signaling is required for patterned apical constriction and cranial neural tube closure</td>
<td>Eric Brooks(^1(^2), Mohammed T. Islam(^1(^2), Kathryn V. Anderson(^1), Jennifer A, Zallen(^1(^2) ((^1)Sloan Kettering Institute, USA; (^2)Howard Hughes Medical Institute, USA)</td>
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<td>436</td>
<td>A6</td>
<td>Tissue-level imaging and analysis reveals region-specific role of Shroom3 in regulation of actin &amp; N-cadherin-based junctional dynamics during Neural Tube Closure</td>
<td>Austin Baldwin, Juliana Kim, John Wallingford (University of Texas at Austin, USA)</td>
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3:30 pm **Group B** (Theme: Morphogenesis)

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<tr>
<td>455</td>
<td>B1</td>
<td>A multi-layered and dynamic apical extracellular matrix shapes the vulva lumen in Caenorhabditis elegans</td>
<td>Jennifer Cohen(^1), Alessandro Sparacio(^1), Alexandra Belfi(^1), Rachel Forman-Rubinsky(^1), David Hall(^2), Hannah Maul-Newby(^3), Alison Frand(^3), Meera Sundaram(^1) ((^1)University of Pennsylvania, USA; (^2)Albert Einstein College of Medicine, USA; (^3)University of California, Los Angeles, USA)</td>
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<td>456</td>
<td>B2</td>
<td>Dynamics of primitive streak regression controls the fate of neuro-mesodermal progenitors in the chicken embryo</td>
<td>Charlene Ryan-Guillot(^1(^2), Arthur Michaut(^1(^2), Brian Rabe(^1), Olivier Pourquie(^1(^2) ((^1)Harvard medical school, USA; (^2)Brigham and W'mone's hospital, USA)</td>
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<td>457</td>
<td>B3</td>
<td>Cellular and Molecular Mechanisms of Sensory Organ Segregation in The Embryonic Inner Ear</td>
<td>Ziqi Chen, Nicolas Daudet (University College London, United Kingdom)</td>
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<td>458</td>
<td>B4</td>
<td>Morphogenesis during the asexual reproduction in the class Scyphozoa (Cnidaria)</td>
<td>Alena Sukhputova(^1(^2), Yulia Kraus(^1) ((^1)Lomonosov Moscow State University, Russia; (^2)Koltzov Institute of Developmental Biology of Russian Academy of Sciences, Russia)</td>
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<td>459</td>
<td>B5</td>
<td>Studying cell sorting during Drosophila abdominal morphogenesis</td>
<td>Sotiroula Chatzimatthaiou, Marcus Bischoff (University of St Andrews, GB)</td>
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<td>460</td>
<td>B6</td>
<td>Stromally expressed β-catenin modulates pathways and genes that regulate key developmental processes during kidney development</td>
<td>Erin Deacon, Anna Li, Felix Boivin, Anna Dvorkin-Gheva, Joanna Cunan, Darren Bridgewater (Department of Pathology and Molecular Medicine, McMaster University, Canada)</td>
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4:00 pm **Group C** (Theme: Morphogenesis)

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<tr>
<td>479</td>
<td>C1</td>
<td>Transient Nodal signalling in left precursors coordinates opposed asymmetries shaping the heart loop</td>
<td>Audrey Desgrange(^1(^2), Jean-François Le Garrec(^1(^2), Ségolène Bernheim(^1(^2), Tobias Holm Bønnylykke(^1(^2), Sigolène Meilhac(^1(^2) ((^1)Imagine - Institut Pasteur, Laboratory of Heart Morphogenesis, 75015 Paris, France; (^2)INSERM UMR1163, 75015 Paris, France)</td>
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<td>480</td>
<td>C2</td>
<td>Genetic interaction between Sostdc1 and Msx1 during mouse tooth morphogenesis</td>
<td>Yongjin Jung, Hyuk-Jae Edward Kwon (Department of Oral Biology, School of Dental Medicine, University at Buffalo, State University of New York, U.S.A.)</td>
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<td>481</td>
<td>C3</td>
<td>Spatiotemporal transcriptional dynamics of the cycling mouse oviduct</td>
<td>Elle Roberson, Riddhiman Garge, Ngan Kim Tran, Harrison Mark, Anna Battenhouse, Edward Marcotte, John Wallingford (University of Texas at Austin, USA)</td>
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<td>482</td>
<td>C4</td>
<td>Wnt signaling modulates the expression of ion channels to promote trachealis smooth muscle organization in mouse developing respiratory tract.</td>
<td>Kaulini Burra(^1), Ronak Shah(^1(^3), Nathan Hilvano(^1(^4), John Snowball(^1), Debora Sinner(^1(^2) ((^1)Neonatology and Pulmonary Biology, Perinatal Institute-Cincinnati Children’s Hospital Medical Center, USA; (^2)University of Cincinnati, College of Medicine, USA; (^3)University of Cincinnati, Honors Program, USA; (^4)University of Cincinnati, Biomedical Engineering Program, USA)</td>
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<td>483</td>
<td>C5</td>
<td>Morphogenesis of the upper lip: insights from time-lapse imaging</td>
<td>Camilla Teng, Teng Teng, Jeffrey Bush (University of California San Francisco, USA)</td>
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4:30 pm Break

Live Q&A Poster Session 22

3:00 pm **Group A** (Theme: Patterning and Embryo Development)
Analysis of the talpid reveals impaired osteogenesis and bone-remodeling as mechanisms for ciliopathic micrognathia. Christian Bonatto Paese, Evan Brooks, Megan Aarnio-Peterson, Samantha Brugmann (Cincinnati Children's Hospital Medical Center, USA; MedPace, USA)

The highest levels of transcription factor Dorsal dampen, not promote, gene expression by regulating enhancer action. Jihyun Irizarry, James McGehee (California Institute of Technology, United States)

Timer genes that regulate segmentation in Drosophila can also largely explain segmentation dynamics in Nasonia vitripennis. Shannon Taylor, Peter Dearden (Genomics Aotearoa and Department of Biochemistry, University of Otago, New Zealand)

From gastrulation to left-right patterning in veiled chameleon (Chamaeleo calyptratus). Natalia Shylo, Paul Trainor (Stowers Institute for Medical Research, USA)

Discovery of genes required for body axis and limb formation by global identification of retinoic acid regulated enhancers and silencers. Marie Berenguer, Karolin F. Meyer, Gregg Duester (Sanford Burnham Prebys Medical Discovery Institute, USA)

BMP and WNT signaling crosstalk to promote patterning of the developing large airways of the respiratory tract. Natalia Bottasso Arias, Lauren Leesman, Kaulini Burra, Megha Mohanakrishnan, John Snowball, Debora Sinner (Division of Neonatology and Pulmonary Biology, Perinatal Institute, Cincinnati Children’s Hospital Medical Center, USA; University of Cincinnati College of Medicine, USA; University of Cincinnati’s Honors Program, USA)

Imaging cytoskeletal dynamics that regulate fate specification and morphogenesis to pattern the early mouse embryo. Hui Yi Grace Lim, Yanina D Alvarez, Maxime Gasnier, Stephanie Bissiere, Nicolas Plachta (Agency for Science, Technology and Research, SG)

Δ9-tetrahydrocannabinol (THC) inhibits Hedgehog pathway signaling and promotes holoprosencephaly and neural tube patterning defects in Cdon mutant mice. Hsiao Fan Lo, Mingi Hong, Henrietta Szutorisz, Yasmin Hurd, Robert Krauss (Department of Cell, Developmental, and Regenerative Biology, Icahn School of Medicine at Mount Sinai, USA; Departments of Psychiatry, Neuroscience and Pharmacology and Systems Therapeutics, Icahn School of Medicine at Mount Sinai, USA)

Autodecapitation linked to regulative trunk development after C quadrant ablation in neogastropod embryos. Morgan Goulding (Georgia Southwestern State University, USA)

Spatiotemporal patterning of ABCB, ABCC, and ABCG small molecule transporters during development: A framework for signaling and protective functions. Catherine Schrankel, Amro Hamdoun (University of California, San Diego, USA; Scripps Institution of Oceanography, USA)

Integrating Cell Size with Genome Activation and Cell Fate Decision During Early Development. Hui Chen, Wenchao Qian, Matthew Good (Department of Cell and Developmental Biology, Perelman School of Medicine, University of Pennsylvania, Philadelphia, PA 19104, USA; Department of Bioengineering, School of Engineering and Applied Science, University of Pennsylvania, Philadelphia, PA 19104, USA)

Molecular and genetic analyses reveal that mRNA decay and translational control mechanisms are important for segmentation clock gene regulation. Monica Mannings, Thomas Gallagher, Kiel Tietz, Sharon Amacher (The Ohio State University, USA)

Dysregulation of embryonic microglia population size, morphology, and activity due to perfluoroalkyl substance exposure. April Rood, Nathan Martin, Jessica Plavicki (Brown University, USA)

Clearing axonal debris after Wallerian degeneration in an ex vivo zebrafish scale model. Eric Peterman, Jeff Rasmussen (University of Washington, USA)

Lymphoangiocrine signals regulate cardiac growth. Xiaolei Liu, Xiaowu Gu, Laszlo Balint, Michael Oxendine-Burns, Tamara Terrones, Wanshu Ma, Paul Burridge, Zoltan Jakus, Joachim Herz, Ondine Cleaver (Northwestern University, USA; Semmelweis University School of Medicine, Hungary)
488 C4 Desert Hedgehog-primary cilia signaling shapes mitral valve morphogenesis and disease Diana Fulmer, Katelynn Toomer, Janiece Glover, Lilong Guo, Kelsey Moore, Reese Moore, Cortney Gensemer, Mary Kate Rumph, Faith Emetu, Justin Bian, Joshua Lipschutz, Russell Norris (Medical University of South Carolina, USA)

489 C5 Hedgehog Signal Transduction in Development via Membrane Sequestration of PKA Subunits Benjamin Myers1, Corvin Arveseth1, John Happ1, Danielle Hedeen1, Ju-Fen Zhu1, Jacob Capener1, Dana Klatt Shaw1,3, Ishan Deshpande2, Jiwei Xu2, Sara Stubben1,4, Isaac Nelson1, David Grunwald1, Ruth Huttenhain2, Aashish Manglik2 (1University of Utah School of Medicine, USA; 2University of California, San Francisco, USA; 3Washington University in St. Louis, USA; 4Brigham Young University, USA)

490 C6 Structural and Molecular Characterization of the EVL-Deep Cell Boundary during Zebrafish Development Sirma Damla User, Nathan Rutherford, Ashley Bruce (University of Toronto, Canada)

4:30 pm Break

Live Q&A Poster Session 23

3:00 pm Group A (Theme: Genetic Models of Disease)

443 A1 Early gestational alcohol exposure disrupts key gene pathways during embryonic development Karen Boschen1, Eric Fish1, Haley Mendoza-Romero1, Henry Gong1, Rachel Peterson1, Casey Hunter1, Johann Eberhart2, Scott Parnell1 (1University of North Carolina, USA; 2University of Texas at Austin, USA)

444 A2 Caenorhabditis elegans PIEZO Channel Coordinates Multiple Reproductive Tissues to Govern Ovulation Xiaofei Bai1, Jeff Bourffard2, Avery Lord2, Katherine Brugman3, Paul Sternberg3, Erin Cram2, Andy Golden1 (1National Institutes of Health, USA; 2Northeastern University, USA; 3California Institute of Technology, USA)

445 A3 Cdon mutation and fetal alcohol converge on Nodal signaling in a gene-environment interaction model of holoprosencephaly Mingi Hong1, Annabel Christ2, Anna Christa2, Thomas E. Willnow2, Robert S. Krauss1 (1Icahn School of Medicine at Mount Sinai, USA; 2Max-Delbruck-Center for Molecular Medicine, Germany)

446 A4 Top autism risk genes and estrogen signaling converge during forebrain neurogenesis Helen Willsey1,2, Cameron R. T. Exner1, Yuxiao Xu1,2, Amanda Everitt1, Jeanselle Dea1, Galina Schmunk1, Nawei Sun1, Yefim Zaitsman1, Nia Teerikorpi1, Albert Kim1,2, Aoife S. Anderson1, David Shin1, Meghan Seyler1, Tomasz J. Nowakowski1, Richard M. Harland2, A. Jeremy Willsey1, Matthew W. State1 (1UCSF, USA; 2UC Berkeley, USA)

447 A5 Semaphorin3f in the post-mitotic regulation of outer retinal health in zebrafish Risa Mori-Kreiner, Sophie Gobeil, Amira Kalifa, Rami Halabi, Sarah McFarlane (University of Calgary, CA)

3:30 pm Group B (Theme: Genetic Models of Disease)

467 B1 The Conserved RNA-binding Protein Rbm24 Post-transcriptionally Controls Gene Expression in Early Eye and Lens Development Shaili Patel, Soma Dash, Shuo Wei (University of Delaware, United States)

468 B2 Chondrocyte polarity during endochondral ossification requires protein-protein interactions between Prickle1 and Dishevelled 2/3 Heather Szabo-Rogers, Yong Wan (University of Pittsburgh, USA)

469 B3 A novel hypomorphic allele in Spag17 causes primary ciliary dyskinesia in mice Zakia Abdelhamed1, Marshall Lukacs1,2, Rolf Stottmann1,3,4 (1Division of Human Genetics, Cincinnati Children’s Medical Center, Cincinnati, 45229, USA; 2Medical Scientist Training Program, Cincinnati Children’s Medical Center, Cincinnati, 45229, USA; 3Division of Developmental Biology, Cincinnati Children’s Medical Center, Cincinnati, 45229, USA; 4Department of Pediatrics, University of Cincinnati, Cincinnati, 45229, United States, USA)

470 B4 Creating a Dominant-Negative Tnagl1 Mutant to Establish an Asymmetrical Craniofacial Model Brooklyn Zwinklis (Augusta University, USA)
A novel role for the Mediator complex subunit Med23, in craniofacial development and in the pathogenesis of Pierre-Robin Sequence

Soma Dash, Shachi Bhatt, Karla Terrazas-Falcon (Stowers Institute for Medical Research, USA)

RNA Polymerase I and III function in neural crest cells and neuronal development

Kristin Watt¹, Chris Seidel¹, Allison Scott¹, Kate Hall¹, Paul Trainor¹,² (¹Stowers Institute for Medical Research, Kansas City, MO, USA; ²Department of Anatomy and Cell Biology, University of Kansas Medical Center, Kansas City, KS, USA)

Understanding the role of CCM3 in endothelial development and disease in Zebrafish

Tvisha Misra¹, James Knight², Anne-Claude Gingras², Ian Scott¹ (¹Hospital for Sick Children, Canada; ²Lunenfeld-Tanenbaum Research Institute, Canada)

Zebrafish, genes, and human kidneys: gene mapping in a zebrafish mutant may help elucidate pathways involved in Polycystic Kidney Disease

Jamie Lyman Gingerich, Megan Schleusner (University of Wisconsin-Eau Claire, USA)

Cell reintegration failure: a novel model for tumorigenesis

Tara Finegan, Christian Cammarota, John Miller, Dan Bergstrahl (University of Rochester, USA)

Keratin 13 Deficiency Causes White Sponge Nevus in Mice

Laura Simonson¹, Hao Chang¹, Samantha Vold¹, Colton Mowers¹, Randall J Massey¹,², Irene M Ong¹, B. Jack Longley¹,² (¹University of Wisconsin-Madison, School of Medicine and Public Health, USA; ²William S. Middleton VA Medical Center, Madison, Wisconsin 53706, United States)

Drosophila Chitinase-like proteins participate in tissue morphogenesis, cell migration, immune response, and CO₂ sensitivity

Sandra Zimmerman, Anne Sustar, Liesl Strand, Celeste Berg (Department of Genome Sciences, University of Washington, Seattle, Washington, USA)

Sarcomere formation in skeletal muscle is sensitive to Mylpf dosage

Jared Talbot¹,², Emily Teets², Jessica Chong³,², Brit Martin², Paul Janssen², Deborah Nickerson²,³, Samantha Previs⁶, David Warshaw⁶, Michael Bamshad³,⁴,⁵, Sharon Amacher² (¹University of Maine, USA; ²The Ohio State University, USA; ³University of Washington, Seattle, USA; ⁴Brotman-Baty Institute, USA; ⁵Seattle Children’s Hospital, USA; ⁶University of Vermont, USA)

Cdx factors play a critical role in establishing trunk neural crest identity and behavior

Manuel Rocha, Elaine Kushkowski, Ruby Schnirman, Victoria Prince (University of Chicago, USA)

In vivo imaging reveals proliferative wave front of enteric neural crest drives migration and colonization within the zebrafish enteric nervous system

Phillip Baker, Akshaya Venkatesh, Rosa Uribe (Rice University, USA)

It takes a village to build a brain: Defining the heterogeneous glial and neural crest contributions to zebrafish forebrain development and neurogenesis

Jake Schnabl¹, Mackenzie Litz², Nadia Penkoff-Lidbeck³, Morgan Schwartz³, Sarah Bashirudden³, Caitlin Schneider³, Michael Barresi¹,² (¹Umass Amherst, USA; ²Smith College, United States)

Embryonic hyperglycemia causes a reduction in photoreceptor cells and increased oxidative stress in the developing retina

Kayla Titialii (University of Kentucky, USA)

Photoreceptor Cell Development and Survival Require Siah E3 ubiquitin ligase regulation in CDHR1α Protein Stability During Zebrafish Retina Development

Warlen Pereira Piedade, Kayla Titialii-Torres, Ann Morris, Jakub Famulski (University of Kentucky, USA)

Molecular mechanisms that consolidate temporal identity in developing Drosophila motorneurons.
Austin Seroka\textsuperscript{1}, Keiko Hirono\textsuperscript{1,2}, Chris Doe\textsuperscript{1,2} (\textsuperscript{1}University of Oregon, USA; \textsuperscript{2}Howard Hughes Medical Institute, USA)

3:30 pm \textbf{Group B} (Theme: Neural Development and Patterning)

473 B1 \textit{Insma1 Facilitates Spatiotemporal Modulation of Notch Signaling-Mediated Olfactory Neurogenesis} Sriivatsan Govinda Rajan, Lynne M. Nacke, Kaelan Wong, Jocelyn Garcia, Nathan Burg, Ankur Saxena (University of Illinois at Chicago, USA)

474 B2 \textit{Spatial Structuring and Dynamical Stability of Olfactory Epithelium Assembly} Joseph Lombardo\textsuperscript{1}, Vijay Warren\textsuperscript{1}, Bi-Chang Chen\textsuperscript{2}, Eric Betzig\textsuperscript{3}, Ankur Saxena\textsuperscript{1} (\textsuperscript{1}University of Illinois at Chicago, USA; \textsuperscript{2}Academia Sinica, Taiwan; \textsuperscript{3}HHMI Janelia Research Campus, USA)

475 B3 \textit{Prdm8 regulates pMN progenitor specification for motor neuron and oligodendrocyte fates by modulating Shh signaling response} Kathryn Scott, Rebecca O’Rourke, Austin Gillen, Bruce Appel (University of Colorado Anschutz Medical Campus, USA)

476 B4 \textit{The role of Claudin-3 in neural tube closure} Elizabeth-Ann Legere\textsuperscript{1,2}, Aimee Ryan\textsuperscript{1,2} (\textsuperscript{1}McGill University, CA; \textsuperscript{2}RI-MUHC, CA)

477 B5 \textit{Snx3 is important for mammalian neural tube closure via its role in canonical and non-canonical WNT signaling} Heather Brown\textsuperscript{1}, Lee Niswander\textsuperscript{1}, Hope Northrup\textsuperscript{1}, Kit Sing Au\textsuperscript{2}, Stephen Murray\textsuperscript{2} (\textsuperscript{1}University of Colorado, USA; \textsuperscript{2}The Jackson Laboratory, USA; \textsuperscript{3}University of Texas Health Science Center at Houston, USA)

478 B6 \textit{Tuba1a microtubules are uniquely important for axon guidance through midline commissural structures} Kyle Northington, Georgia Buscaglia, Katelyn Hoff, Jayne Aiken, Jeffrey Moore (University of Colorado Anschutz Medical Campus, USA)

4:00 pm \textbf{Group C} (Theme: Stem Cells and Tissue Regeneration)

497 C1 \textit{In search of a pro-regenerative macrophage} Jennifer Simkin\textsuperscript{1}, Mike Adams\textsuperscript{3}, Fatemeh Safaee\textsuperscript{2}, Shishir Biswas\textsuperscript{2}, Ajoy Aloysius\textsuperscript{2}, Steve Potter\textsuperscript{3}, Ashley Seifert\textsuperscript{2} (\textsuperscript{1}LSUHSC, USA; \textsuperscript{2}University of Kentucky, USA; \textsuperscript{3}Cincinnati Children's Hospital Medical Center, USA)

498 C2 \textit{A metabolic shift to glycolysis promotes zebrafish tail regeneration through TGF-B dependent dedifferentiation of notochord cells to form the blastema} Jason Sinclair\textsuperscript{1}, David Hoying\textsuperscript{1}, Erica Bresciani\textsuperscript{1}, Damian Dalle Nogare\textsuperscript{2}, Carli Needle\textsuperscript{1}, Weiwei We\textsuperscript{1}, Kevin Bishop\textsuperscript{1}, Abdel Elkahloun\textsuperscript{1}, Ajay Chitnis\textsuperscript{2}, Paul Liu\textsuperscript{1}, Shawn Burgess\textsuperscript{1} (\textsuperscript{1}National Human Genome Research Institute, USA; \textsuperscript{2}National Institute of Child Health and Human Development, USA)

499 C3 \textit{Localized and tissue-wide changes during regeneration revealed by single-cell analysis in Drosophila} Melanie Worley, Nicholas Everetts, Riku Yasutomi, Nir Yosef, Iswar Hariharan (University of California, Berkeley, USA)

500 C4 \textit{Human pluripotent stem cell modeling of the ATOH1 lineage reveals a heterochronic shift in transcriptional regulators in the developing human cerebellum} Hourinaz Behesti, Arif Kocabas, Thomas Carroll, Mary E Hatten (The Rockefeller University, United States)

501 C5 \textit{Characterization of p63 positive basal cells in Vomeronasal organ} Raghu Katreddi, Ezinma Dennis, Paolo Forni (University at Albany, USA)

502 C6 \textit{Reprogramming of human retinal pigment epithelium to retina progenitors} Jared Tangeman\textsuperscript{1}, Phuong TL Lam\textsuperscript{1}, Christian Gutierrez\textsuperscript{1}, Nathan Burns\textsuperscript{1}, Kapil Bharti\textsuperscript{2}, Byran Smucker\textsuperscript{3,4}, Katia Del Rio-Tsonis\textsuperscript{1,4}, Michael L Robinson\textsuperscript{1,5} (\textsuperscript{1}Department of Biology, Miami University, USA; \textsuperscript{2}Unit on Ocular and Stem Cell Translational Research, National Eye Institute, National Institutes of Health, USA; \textsuperscript{3}Department of Statistics, Miami University, USA; \textsuperscript{4}Center for Visual Sciences at Miami University, USA)

4:30 pm \textit{Break}

WEDNESDAY JULY 15

Live Q&A Poster Session 25
11:00 am  **Group A** (Theme: Development and Evolution)

**503 A1**  *Inflammasomes and Autophagy in Endometrium during the course of Embryo Implantation*  Richa Sharma, Geeta Godbole, Anjana Dr, Deepak Modi (NIRRH, INDIA)

**504 A2**  *Analyzing mitochondrial single amino acid variants for mito-nuclear incompatibilities among Danionin species*  Trevor Chamberlain (University of Wisconsin - Madison, USA)

**505 A3**  *Assessing the mid- blastula transition within an interspecies model system across Danionin species.*  Ryan Trevena (University of Wisconsin - Madison, USA)

**506 A4**  *Sex Determination in Xenopus*  Danielle Jordan¹, Caroline Cauret², Ben Jonathan Evans², Marko Horb¹  (¹National Xenopus Resource and Bell Center for Regenerative Biology and Tissue Engineering, Marine Biological Laboratory, USA; ²Department of Biology, McMaster University, Canada)

**507 A5**  *Dynamic changes in cell type specific transcriptome during sex determination in the mouse*  Domdatt Singh³, Priyanak Narad³, Neha Singh³, Anshul Bhide³, Abhishek Sengupta², Deepak Modi¹  (¹Molecular and Cellular Biology Laboratory, National Institute for Research in Reproductive Health, ICMR, J. M. Street, Parel, Mumbai 400012, India; ²Centre for Computational Biology & Bioinformatics Amity Institute of Biotechnology Amity University Uttar Pradesh J-3 Block, Room No: 412, Sector 125, Noida Uttar Pradesh-201313, India)

**508 A6**  *Lunatic Fringe-dependent glycosylation of Delta-like3 regulates oscillatory Notch activation in Mus musculus and Gallus gallus models of vertebrate segmentation*  Dustin Servello, M. Skye Bochter, Daniel Beyer, Susan E. Cole (The Ohio State University, United States)

11:30 am  **Group B** (Theme: Development and Evolution)

**527 B1**  *Role of tubulin isotypes in nematode resistance to a microtubule inhibitor*  Linda Pallotto¹,², Chandrasekhar Gopalakrishnan¹, John Gilleard¹, Paul Mains¹  (¹University of Calgary, CA; ²University of Waterloo, CA)

**528 B2**  *Interspecies transcriptome analyses identify genes that control the development and evolution of limb skeletal proportion.*  Aditya Saxena (University of California, San Diego, USA)

**530 B4**  *The Evolution of the Echinoderm Pigment Cell*  Maxwell Spurrell, Margherita Perillo, Gary Wessel (Brown University, USA)

**531 B5**  *The role of BMP signaling in early development of the spiralian Capitella teleta*  Nicole Webster, Néva Meyer (Clark University, USA)

**532 B6**  *The Evolution of Nociceptor Neurons in Sharks*  Roland Mina Lacap, Mikayla Tesoro, Martin van der Plas, Dr. Maria Elena de Bellard (California State University Northridge, United States of America)

12:00 pm  **Group C** (Themes: Development and Evolution; Cell Growth and Polarity)

**551 C1**  *Dynamics of transcription during germband formation and segmentation in Tribolium castaneum*  Benjamin Goldman-Huertas¹, Terri Williams², Jeffery Sagun², Lisa Nagy¹  (¹The University of Arizona, USA; ²Trinity College, USA)

**552 C2**  *How the Beetle got its Stripes: A Look into the Mechanism and Eve-olution of the Tribolium castaneum Segmentation Oscillator.*  Bennett Van Camp, Son Tran, Benjamin Goldman-Huertas, Robert Porter, Hector D. Garcia-Verdugo, Lisa Nagy (University of Arizona, United States)

**553 C3**  *Endodermal contributions revise the placodal origin of the vertebrate pituitary*  Peter Fabian¹, Kuo-Chang Tseng¹, Joanna Smeeton¹,², Joseph Lancman³, Duc Dong¹, Robert Cerny³, Gage Crump¹  (¹University of Southern California, USA; ²Columbia University, USA; ³Sanford Burnham Prebys, USA; ⁴Charles University, Czechia)

**554 C4**  *Genetic interactions between pam-1 and wee-1.3 during embryonic development and oocyte maturation in C. elegans*  Rebecca Lyczak¹, Dorothy Benton¹, Caprice Eisele¹, Danielle Uibel¹, Arielle Kliner¹,², Eva Jaeger¹  (¹Ursinus College, USA; ²Drexel University, USA)

**555 C5**  *Fluorescently tagged knock-in allele allows live imaging and degradation-mediated manipulation of planar cell polarity in zebrafish*  Maria Jussila¹, Curtis Boswell¹,², Brian Ciruna¹,²  (¹Developmental and
Distinct activities of Scrib module proteins organize epithelial polarity Mark Khoury, David Bilder (University of California, Berkeley, United States)

Live Q&A Poster Session 26

11:00 am Group A (Theme: Cell Fate Specification and Differentiation)

509  A1 Investigation of Notch Signaling in Cone Fate Specification in Vertebrate Retina Xueqing Chen, Shirley Chan, Denice Moran, Mark Emerson (City University of New York, USA)

510  A2 Salinity-dependent invasion of skin-derived ionocytes into hair cell-containing mechanosensory organs Daniela Münch1,2, Julia Peloggia1, Paloma I. Meneses Giles1, Andrés Romero-Carvajal3, Melaina McClain1, Tatjana Piotrowski1 (1Stowers Institute for Medical Research, USA; 2Technische Universität Braunschweig, Germany; 3Pontificia Universidad Católica del Ecuador, Ecuador)

511  A3 LIM homeodomain (LIM-HD) transcription factor, Lhx2 regulates meiotic progression in mouse fetal ovary Neha Singh, Domdatt Singh, Anshul Bhide, Deepak Modi (National Institute for Research in Reproductive Health-Indian Council of Medical Research (ICMR-NIRRH), J.M. Street, Parel, Mumbai-400012, India)

512  A4 The interplay between environmental signals and position of cells is decisive for T-cell lineage commitment Advaita M Dick1, Narges Aghaalaei1,2, Eva Hasel3, Thomas Thumberger4, Joachim Wittbrodt5, Baubak Bajoghli1,2 (1University of Tuebingen, Germany; 2EMBL, Germany; 3Heidelberg University, Germany)

513  A5 Twist1a limits cardiomyocyte differentiation in zebrafish Deepam Gupta1, Kristina M. Garske1, Yocheved L. Schindler1, Elliot Perens1,2, Camilla S. Teng3, J. Gage Crump3, Deborah Yelon1 (1Division of Biological Sciences, University of California, San Diego, USA; 2Division of Pediatric Nephrology, University of California, San Diego, USA; 3Stem Cell Biology and Regenerative Medicine, University of Southern California, USA)

514  A6 Fatty-Acid β-Oxidation regulates the differentiation of Drosophila myeloid progenitors Satish Kumar Tiwari1, Ashish Ganeshlalji Toshniwal2, Sudip Mandal2, Loliitka Mandal1 (1Developmental Genetics Laboratory, Indian Institute of Science Education and Research, Mohali, 140306, India; 2Molecular Cell & Developmental Biology Laboratory, Indian Institute of Science Education and Research, Mohali, 140306, India)

11:30 am Group B (Theme: Cell Fate Specification and Differentiation)

533  B1 Mitotic kinases choreograph receptor storage and redistribution during asymmetric division Bradley Davidson1, Christina Cota2, Matthew Dreier5, William Colgan3, Anna Cha4 (1Swarthmore College, USA; 2Colby College, USA; 3MIT, USA; 4Harvard University, USA; 5NYU, USA)

534  B2 A conserved molecular cascade initiates a trophectoderm program in human, cow and mouse embryos prior to blastocyst formation. Claudia Gerri1, Afshan McCarthy1, Gregorio Alanis-Lobato5, Andrej Demtschenko2, Alexandre Bruneau3, Sophie Loubersac3, Norah M.E. Fogarty4, Daniel Hampshire4, Kay Elder5, Phill Snell5, Leila Christie5, Laurent David2, Hilde Van de Velde3, Ali A. Fouladi-Nashta4, Kathy K. Niakan1 (1The Francis Crick Institute, United Kingdom; 2Vrije Universiteit Brussel, Belgium; 3UNIV Nantes, Inserm, CHU NANTES, France; 4Royal Veterinary College, United Kingdom; 5Bourn Hall Clinic, United Kingdom)

535  B3 Axon-like projections direct the self-renewal versus differentiation cell fate decision in Follicle Stem Cells of the Drosophila ovary Eric Lee, Melissa Wang, Cindy Chau, Jessica Reinach, Alberto Vargas, Alana O'Reilly (Fox Chase Cancer Center, USA)

536  B4 The conserved histone deacetylase, HDA-1, functions in cell cycle-dependent and independent roles to
promote invasive differentiation Nicholas Palmisano, Becca Adikes, Michael Martinez, Taylor Medwig-Kinney, Rumana Rahman, Yutong Xiao, Wan Zhang, David Matus (Stony Brook University, USA)

**537 B5** The lysine methyltransferase SETD2 regulates early neural crest development Julaine Roffers-Agarwal, Kevin A. Lidberg, Laura S. Gammill (Univ of Minnesota, USA)

**538 B6** Signaling pathways that reinforce ventricular chamber identity in zebrafish Amanda Marra, Joshua Bloomekatz, Sara Marques, Deborah Yelow (University of California, San Diego, USA)

12:00 pm **Group C** (Theme: Molecular Medicine, Cancer, and Development)

**557 C1** Cholesterol stimulates SHH release from Human PDAC cells via CDON Jennifer Alexander1, Esteban Martinez1, Alberto Vargas1, Daniel Zinshteyn1, Valerie Sodi1, Denise Connolly1, Tiffney Hartman2, Alana O'Reilly1 (1Fox Chase Cancer Center, United States; 2Children's Hospital of Philadelphia, United States)

**558 C2** Peptide ligand LXY30 for targeting Cancer Stem Cells Vigneshwari Easwar Kumar1,2, Roshni Nambiar1,2, Wenwu Xiao1, Kit Lam1 (1University of California, Davis, USA; 2California State University, Channel Islands, USA)

**559 C3** Paclitaxel Resistance in Breast Cancer is Regulated by Loss of Adenomatous Polyposis Coli Camden Hoover1,2, Emily Astarita1,3, Sara Maloney1,4, Jenifer Prosperi1,2,4 (1Harper Cancer Research Institute, A103 Harper Hall, South Bend, IN, USA; 2Department of Biological Sciences, University of Notre Dame, Notre Dame, IN, USA; 3Department of Chemistry/Biochemistry, University of Notre Dame, Notre Dame, IN, USA; 4Indiana University School of Medicine – South Bend, Department of Biochemistry and Molecular Biology, South Bend, IN, USA)

**560 C4** Studying consequences of cell-cell fusion using Drosophila neural stem cells as a model system Bharath Sunchu, Nicole Lee, Clemens Cabernard (University of Washington, USA)

**561 C5** Prostaglandin synthesis influences 3D organization of uterine glands and blood vessels in the pre-implantation uterus Savannah Wright1, Sameed Khan1, Diana Flores1,2, Ripla Arora1,2 (1Michigan State University, USA; 2Department of Obstetrics, Gynecology and Reproductive Biology, Michigan State University, USA)

12:30 pm **Break**

Live Q&A Poster Session 27

11:00 am **Group A** (Themes: Cell-Cell Signaling; Epigenetics; Genetic Models of Disease)

**515 A1** Analysis of vertebrate Delta like-3 genes and proteins: Implications for cellular localization and function Jeanne Wilson-Rawls1, Joanna Palade1, Alexis Boschi1, Walter Eckalbar2, Kenro Kusumi1, Alan Rawls1, Jason M. Newbern1, Melissa Wilson1 (1Arizona State University, USA; 2University of California San Francisco, USA)

**516 A2** Prodomain-mediated Regulation of Vg1-Nodal Signaling during Animal Development P. C. Dave Dingal1, Adam Carte1, Tessa Montague1, Richard Losick1, Alexander Schier1,2,3 (1Harvard University, USA; 2Allen Discovery Center for Lineage Tracing, USA; 3Biozentrum, University of Basel, Switzerland)

**517 A3** Developmental Bisphenol A Exposure Induced Hypermethylation In Primordial Germ Cells And Sperm In Medaka Fish Xuegeng Wang, Ramji K. Bhandari (The University of North Carolina at Greensboro, USA)

**518 A4** Role of gabra1 during developmental behavior. Nayeli Reyes-Nava, Anita M. Quintana (The University of Texas at El Paso, USA)

**519 A5** Understanding ALS using the Drosophila Tripartite synapse. Shweta Tendulkar, Girish Ratnaparkhi (Indian Institute of Science Education and Research (IISER), Pune., India)

**520 A6** Wnt pathway mutants show differential hair cells regeneration in the zebrafish lateral line Ellen Megerson (University of Missouri - Kansas City, USA)

11:30 am **Group B** (Themes: Single Cell Analysis; Stem Cells and Tissue Regeneration)

**539 B1** Epigenetic modulation of single cell transcriptome during palatogenesis Bo Sun, Shuwen Zhang, Kurt
Reynolds, Michael Garland, Yu Ji, Ran Gu, Mohammad Islam, Yue Liu, Chengji Zhou (Department of Biochemistry and Molecular Medicine, Institute for Pediatric Regenerative Medicine, University of California at Davis, School of Medicine, Sacramento, CA 95817, United States)

540 B2 CeLaVi: A web-based tool for interactive Cell Lineage Visualisation Irepan Salvador-Martinez1, Michalis Averof2,3, Marco Grillo2,3, Maximilian J. Telford1 (1Centre for Life's Origins and Evolution, Department of Genetics Evolution and Environment, University College London, United Kingdom; 2Institut de Génomique Fonctionnelle de Lyon (IGFL), École Normale Supérieure de Lyon, France; 3Centre National de la Recherche Scientifique (CNRS), France)

541 B3 Chromatin accessibility and single cell transcriptomics expand the gene regulatory network of sea urchin gut development Danila Voronov1, Periklis Paganos1, Marta S. Magri2, Jose Luis Gómez-Skarmeta2, Detlev Arendt3, Maria I. Arnone1 (1Stazione Zoologica Anton Dohrn, Italy; 2Centro Andaluz de Biología del Desarrollo, Spain; 3European Molecular Biology Laboratory, Germany)

542 B4 Tracking periocular mesenchyme derived anterior segment development using single cell transcriptomic analysis Oliver Voecking1, Jeramiah J. Smith, Jakub K. Famulski (University of Kentucky, USA)

543 B5 Single Cell and Reporter Analysis of Skeletal Muscle Interstitial Cells Identifies Unique Non-myogenic Mesenchymal Cell Populations Abigail Leinroth1, Jason Long1, Anthony Miranda1, Yihan Liao1, Joe Chakkalakal2, Matthew Hilton1 (1Duke University, USA; 2University of Rochester, USA)

544 B6 orb2, a novel microcephaly gene, regulates centrosomes in Drosophila neural stem cells Beverly Robinson (Emory University, USA)

12:00 pm Group C (Theme: Epigenetics)

562 C1 Building Patterning-Dependent Chromatin States Shelby Blythe (Northwestern University, USA)

563 C2 Analysis of epigenetic gene regulation of neurodevelopment using a novel zebrafish epigenetic reporter transgenic line Miranda Marvel, Aniket V. Gore, Kiyohito Taimatsu, Daniel Castranova, Andrew Davis, Brant M. Weinstein (NICHD/NIH, USA)

564 C3 DNA methyltransferase disruption in the cranial neural crest causes cleft lip and palate in the mouse Austin Steward, Caden Ulschmid, Miranda Sun, Kenneth Rivera-Gonzalez, Alexander Martin, Macy Barnes, Lorena Wicklund, Diya Joseph, Chad Vezina, Robert Lipinski (University of Wisconsin-Madison, Department of Comparative Biosciences, United States)

565 C4 Regulation of epigenetics and development by the Keap1-Nrf2 oxidative/xenobiotic response signaling in Drosophila Huai Deng, Jennifer Carlson, Lindsey Price (University of Minnesota Duluth, USA)

566 C5 A novel transgenic zebrafish line to study epigenetics during disease and development Aniket Gore, Kiyohito Taimatsu, Miranda Marvel, Daniel Castrnova, Avery Swearer, Keith Barnes, Andrew Davis, Brant Weinstein (Eunice Kennedy Shriver National Institute of Child Health and Human Development, NIH, USA)

567 C6 MicroRNA Influence on Craniofacial Development Desiree Williams1, Ariana Hardy1, Steven R. Sera1, Maneeshi Prasad3, Martin Garcia-Castro3, Bruce Blumberg2, Nicole I. zur Nieden1 (1Department of Molecular, Cell and Systems Biology, College of Natural and Agricultural Sciences, University of California Riverside, USA; 2Department of Pharmaceutical Sciences, University of California, Irvine, USA; 3School of Medicine, University of California Riverside, USA)

12:30 pm Break

Live Q&A Poster Session 28

11:00 am Group A (Theme: Stem Cells and Tissue Regeneration)

521 A1 Polycomb Repressive Complex 1 genes regulate tissue regeneration in the planarian Schmidtea mediterranea John Allen1,2, Madison Balagtas1, Elizabeth Barajas1, Ricardo Zayas1 (1San Diego State University, USA; 2University of California, San Diego, USA)

522 A2 Investigating the roles of the RINGs involved in regulating Notch signaling and PRC1 function during
An RNAi screen identifies p21 activated kinase 1 (pak1) to be required for rescaling of body axis during regeneration Viraj Doddihal, Frederick G Mann, Eric Ross, Sean McKinney, Alejandro Sánchez Alvarado (San Diego State University, United States; University of California, San Diego, United States)

Investigating the role of heterotrimeric G protein subunits in planarian regeneration and behavior Jennifer Jenkins, Dr. Rachel Roberts-Galbraith (University of Georgia, United States of America)

The Planar Early Growth Response Transcription Factor-2 (Egr-2) is Required to Regenerate Proper Intestinal Morphology Vasileios Morkotinis, David J Forsthoefel (Genes and Human Disease Research Program, Oklahoma Medical Research Foundation, Oklahoma City, OK, USA; Department of Cell Biology, University of Oklahoma Health Sciences Center, Oklahoma City, OK, USA)

Establishing a model system to probe the effects of age on regenerative growth Alexander Stockinger, Martin Fahrenberger, Simon Haendeler, Madeleine Zillner, Gabriele Andreatta, Arndt von Haeseler, Florian Raible (Max Perutz Labs Vienna, Austria)

The rehabilitation of Freddie Kruger: Evaluating regeneration in the Texas Blind Salamander Warren Vieira, Kelsey Anderson, Lindsay Glass Campbell, Catherine McCusker (Department of Biology, University of Massachusetts Boston, USA; U.S. Fish and Wildlife Service, San Marcos Aquatic Resources Center, San Marcos, TX, USA)

apolipoprotein b orthologs function non-cell autonomously during adult stem cell differentiation in planarians Lily L. Wong, Christina G. Bruxvoort, Phillip A. Newmark, David J. Forsthoefel (Oklahoma Medical Research Foundation, Oklahoma City, Oklahoma, United States; Graduate Program in Biomedical Sciences, University of Oklahoma Health Sciences Center, Oklahoma City, Oklahoma, United States; Howard Hughes Medical Institute, Department of Cell and Developmental Biology, University of Illinois at Urbana-Champaign, Urbana, Illinois, United States; Howard Hughes Medical Institute and Morgridge Institute for Research, University of Wisconsin-Madison, Madison, Wisconsin, United States; Department of Cell Biology, University of Oklahoma Health Sciences Center, Oklahoma City, Oklahoma, United States)

Tail Regeneration in the American Alligator (Alligator mississippiensis): First Characterization of Appendage Regrowth in an Archosaurian Reptile Kenro Kusumi, Cindy Xu, Joanna Palade, Rebecca Fisher, Cameron Smith, Andrew Clark, Samuel Sampson, Russell Bourgeois, Ruth Elsey, Jeanne Wilson-Rawls (Arizona State Univ, USA; University of Arizona College of Medicine-Phoenix, USA; Louisiana Department of Wildlife and Fisheries, USA; Russell Bourgeois, USA)

Axolotl spinal cord regeneration is dependent on brain signals Wilson Pak-Kin Lou, Jifeng Fei, Elly Tanaka (Research Institute of Molecular Pathology, Austria; South China Normal University, China)

Heart Regeneration in a Basal Chordate Keaton Schuster, Lionel Christiaen (New York University, USA)
Comparative Transcriptomics and Single-Cell RNA Seq Identify Divergent Gene Expression in Osteoprogenitors During Zebrafish and Rat Bone Regeneration

Eric Katzung, W. Joyce Tang, Claire Watson, Christopher Allan, Ronald Kwon (University of Washington - Seattle, United States)

12:30 pm Break
1:00 pm Undergraduate Best Poster Competition Finals
1:30 pm Graduate Best Poster Competition Finals
2:00 pm Break
2:30 pm Best Poster Awards Presentation

3:00 pm Posters Only – Poster Session 29 (No Live Q&A, Posters viewable throughout meeting)

Education

An Inclusive Professional Development Boot Camp for Junior Science Faculty

William Anderson¹, James Bedford², Lyon Qiao², Younguen Choi³, Zarin Machanda⁴, Karen Bennett⁵, Ida Chow⁶ (¹Harvard University, USA; ²University of Toronto School of Medicine, Canada; ³Georgetown University, USA; ⁴Tufts University, USA; ⁵University of Missouri School of Medicine, USA; ⁶Society for Developmental Biology, USA)

Trails to Research: An Intensive Introduction to Research for Tribal College Students

Christa Merzdorf¹, Jennifer Forecki¹, Brian Greblunas² (¹Montana State University, USA; ²Aaniiih Nakoda College, USA)

Incorporating Metacognition into a Biology Course to Improve Student Learning

Laura Romano (Denison University, USA)

Emerging Research Organisms

Pomacea canaliculata: a new research organism to study complex eye regeneration

Alice Accorsi¹,², Timothy Corbin¹, Eric Ross¹, Melaina McClain¹, Allison Peak¹, Hua Li¹, Kym Delventhal¹, Anoja Perera¹, Alejandro Sánchez Alvarado¹,² (¹Stowers Institute for Medical Research, USA; ²Howard Hughes Medical Institute, USA)

The Planarian Anatomy Ontology: A resource to connect data within and across experimental platforms

Stephanie Nowotarski¹,², Erin Davies¹,³, Sofia Robb¹, Eric Ross¹,², Nico Matzengolu², Viraj Doodhiha¹, Mol Mir¹, Melaina McClain¹, Alejandro Sánchez Alvarado¹,² (¹Stowers Institute, USA; ²Howard Hughes Medical Institute, USA; ³National Cancer Institute, USA; ²European Bioinformatics Institute, UK)

Computation and Modeling of Cell and Tissue Behavior

Xenobots: computer designed living machines built from amphibian stem cells

Douglas Blackiston¹, Sam Kriegerman², Emma Lederer¹, Josh Bongard², Michael Levin¹ (¹Tufts University, USA; ²The University of Vermont, USA)

PhaRedox: An Improved Image Analysis Pipeline for in vivo Ratiometric Fluorescence Microscopy Reduces Measurement Error and Increases Throughput

Sean Johnsen, Jodie Schiffer, Julian Stanley, Javier Apfeld (Northeastern University, USA)

Mechanics of behavior: Cytoskeletal dynamics that give rise to comprehensive search behavior in the single cell Lacrymaria olor

Elliott Flaum, Samhita Banavar, Deepak Krishnamurthy, Scott Coyle, Manu Prakash (Stanford University, United States)

Mathematical modeling of skin pattern formation in zebrafish

Alexandria Volkening¹, Bjorn Sandstede² (¹Northwestern University, USA; ²Brown University, USA)

Single Cell Analysis
Single-cell and genetic analyses reveal conserved populations and signaling mechanisms of stomach and intestinal stromal niches Ji-Eun Kim, Lijiang Fei, Chi-chung Hui, Guoji Guo, Tae-Hee Kim (Program in Developmental & Stem Cell Biology, The hospital for sick children, Canada; Department of Molecular Genetics, University of Toronto, Canada; Center for Stem Cell and Regenerative Medicine, Zhejiang University of School of Medicine, China)

Potential regulatory elements of the human keratin type II gene locus identified by the analysis of chromatin distant interactions. S. Ulianov, E. Kalabusheva, O. Rogovaya, A. Rippa, V. Terskikh, S. Razin, E. Vorotelyak (Institute of Gene Biology Russian Academy of Sciences, Russia; Koltsov Institute of Developmental Biology of Russian Academy of Sciences, Russia)

Effect of cellular iron deficiency on epigenetic modifications at the Bdnf locus Adriana N Vélez-Avilés, Phu Tran, Michael Georgieff (University of Minnesota Medical School, United States; University of Puerto Rico Rio Piedras, United States)

Characterizing zebrafish tissue regeneration using a novel epigenetic reporter line Avery Swearer, Aniket V Gore, Dan Castranova, Brant Weinstein (NICHD, NIH, United States)

Loss of extreme long-range enhancers drives a human craniofacial disorder Hannah Long, Marco Osterwalder, Ian Welsh, Karissa Hansen, James Davies, Tim Mohun, Diane Dickel, Tomek Swigut, Jim Hughes, Douglas Higgs, Axel Visel, Licia Selleri, Joanna Wysocka (Stanford University, USA; Lawrence Berkeley National Laboratory, USA; University of California San Francisco, USA; University of Oxford, UK; The Francis Crick Institute, UK)

Carbaryl exposure in zebrafish leads to activation of the aryl hydrocarbon receptor pathway and increased cyp1 gene expression Michelle McWhorter, Taylor Barnhisel, Ivonne Perez (Wittenberg University, USA)

Control of C. briggsae germline development by TRA-1-interacting co-factors Satheeja Santhi Velayudhan, Yongquan Shen, Ronald E Ellis (Rowan University School of Osteopathic Medicine, USA)

Deeply conserved enhancer regulates heart and gut looping in vertebrates Xuefei Yuan, Mengyi Song, Patrick Devine, Benoit Bruneau, Michael Wilson, Ian Scott (The Hospital for Sick Children, Canada; University of Toronto, Canada; Gladstone Institutes, USA; UCSF, USA)

Developing an in vivo system for PGC migration using xenotransplantation Lina Afonso, Brandon H. Chacon, Zuzana Vavrusova, Daniel H. Nguyen, Yu Tao, Richard Schneider, Amander Clark, Diana J. Laird (University of California, San Francisco, USA; University of California, Los Angeles, USA)

Adhesive forces promote effective organization, movement, and leader/trailer cell state during collective cell migration. Yelena Bernadskaya, Haicen Yue, Alex Mogilner, Lionel Christiaen (New York University, USA)

Protein Kinase C δ regulates actomyosin organization in cellular protrusions during collective cell migration. Amad Bhatti, Felix Gunawan, Saad Husainie, Adam Kramer, Jing Lu, Dorothea Godt (University of Toronto, Canada)

Protein phosphatase 1 complex controls a balance between collective and single cell modes of migration Yujun Chen, Nirupama Kotian, George Aranjuez, Lin Chen, C Luke Messer, Ashley Burtscher, Keti Sawant, Damien Ramel, Xiaobo Wang, Jocelyn A McDonald (Kansas State University, USA; Lerner Research Institute, Cleveland Clinic, USA; LBCMCP, Centre de Biologie Intégrative (CBI), Université de Toulouse, France)

Evaluating the Effect of Extracellular Gaps on Border Cell Migration in Drosophila Alexander George, Brad Peercy, Michelle Starz-Gaiano (University of Maryland Baltimore County, USA)

Functional analysis of Actin-interacting protein 1 (AIP1) in Drosophila epithelia. Jin Meng, Dorothea Godt
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<td>Anchoring of cortical actin pools by the late endocytic pathway during subcellular tube guidance</td>
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<td>Hemodynamic force is required for vascular smooth muscle cell recruitment to blood vessels during mouse embryonic development</td>
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<td>Shared and distinct mechanisms for cannabinoid receptor, CB1R, and Myosin II in regulation of growth cone filopodia and optic axonal projections in the optic tract</td>
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**Cell Growth and Polarity**

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Death and regeneration of sensory hair cells of the developing inner ear.

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Emily Chien, Stefan Vujadinovic, Arman Draginov, Milos Milic, Ulrich Tepass, Dorothea Godt
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Judy Leatherman
(University of Northern Colorado, United States)

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Daniel Zinshteyn, Eric Lee, Zhen Fu
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(Weill Institute for Neurosciences, Quantitative Biosciences Institute, University of California San Francisco, San Francisco, CA, USA; Department of Molecular and Cell Biology, University of California, Berkeley, Berkeley, CA, USA; Department of Psychiatry, Institute for Neurodegenerative Diseases, Weill Institute for Neurosciences, Quantitative Biosciences Institute, University of California San Francisco, San Francisco, CA, USA)

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