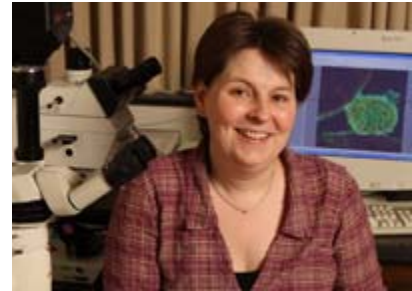


Judith Thorn unearths humanoid origins with students at Knox College

By Marsha E. Lucas

Gargoyle wings, elf ears, and a mermaid tail fin are just a few of the anatomical features studied by students in [Judith Thorn's](#) developmental biology class at Knox College. These so-called humanoids offer a creative way for students to apply their knowledge of basic developmental biology. Thorn, an associate professor at Knox, described this [humanoid project](#) in a poster at the 2010 SDB Annual Meeting for which she was awarded the [John Doctor Best Education Poster Award](#).



Students are asked to choose a humanoid from fiction, film, television or video games, and identify three of its distinguishing characteristics. Based on their understanding of human development, they are asked to describe the cellular and molecular mechanisms that would account for the development of those particular features. Within this framework students are graded on their writing, creativity, and ability to identify relevant primary literature and then use it to make a reasonable and logical argument for each characteristic's origins.

Popular humanoids studied in Thorn's class include vampires, dwarfs, and elves, which she notes "come in all flavors." There are elves from Celtic literature, Tolkien's elves, Santa's elves, and more. As a result, they have many discussions on limb and outer ear development.

"Outer ear development is not real hot on my list of things to know...I'm a *Xenopus* early developmental biologist," Thorn said. "Once you have a spinal cord—I'm good." Nonetheless, she's learned a lot about outer ear development from Shrek and other creatures in her class.

The inspiration for Thorn's humanoid project came years ago while she was a teaching assistant in Albert Harris' vertebrate embryology class at the University of North Carolina. During a lesson on germ layers and their derivatives, Thorn and Harris joked about how it might be different if they were talking about Klingon hearts. Klingons are a Star Trek warrior species that possess an eight-chambered heart. "I don't know that they necessarily bought into it as part of lecture, but it amused us considerably," Thorn said.

Thorn joined the faculty at Knox College in 2000 and began teaching developmental biology. As time went by she began to think that this humanoid project might be a way to engage students and get them to apply their knowledge to something they were really interested in. It would also be a way to review course material for the final exam.

Prior to turning in their three-page papers, students give 10-minute talks on their chosen humanoid and the development of its unique characteristics. They get feedback on their logic and justification from the

class and can then address any issues in their paper. All of the student's papers are placed in the library on reserve so the entire class can use them to study for the final exam.



For Thorn, creativity and originality matter. She hopes students will produce scholarly work that can be submitted into Knox's literary journal, *Catch*, as science fiction. One former student, Andrew Prendergast, wrote a particularly [entertaining piece](#) (pg. 84) on [Pyramid Head](#), a monster from the Silent Hill video games with a "tetrahedral metal helmet" head and a propensity toward violence. Prendergast cleverly writes it "almost like a psychological case study," Thorn said. "But, the developmental biology was excellent and well strung together."

Since implementing the humanoid project in 2006, "students reviewed the activity as a good one, as one that they enjoy and that they can invest in," Thorn said. Although a goal of this project was to help students better understand the course material, "I can't say they're doing better," she said. "But, I can say they appear to like it more."

While much of her time is spent teaching, Thorn is still able to do some developmental biology research of her own. She studies the role of the endocytic protein, Intersectin, in early *Xenopus* development. Recent work with an undergraduate senior Honors student suggests it is required for gastrulation.

One of the advantages to working at a small liberal arts college with a small biology department, is that it has impelled Thorn to interact with faculty from other disciplines. She has collaborated with both an animal behaviorist and clinical psychologist to publish interdisciplinary research with undergraduate students.

One of Thorn's diverse interests is dog training. As a graduate student at UNC, she used the money she won from a teaching award to adopt a shelter dog. "If you helped with [dog training] classes [at the shelter], you could take classes for free and so I was an assistant," she said. With this expertise, Thorn has collaborated with Jennifer Templeton, a faculty member in the Knox biology department who studies learning and cognition in birds, to study learning in dogs.

Thorn credits SDB with helping her maintain her interest in developmental biology. The Society supported her participation in the first Faculty Re-Boot Camp in San Francisco, offered travel awards to regional and national meetings, and has "just been nice to myself and my students," she said. "I know from having been to other societies that not everybody is necessarily as welcoming to teaching faculty and to undergraduate students as SDB is."

Thorn really enjoys the work she is doing at Knox. "I love to teach," she said. "I think that most of the time the best day teaching is better for me than the best day at the bench. That being said, the more bench stuff I get to work, the more exciting that is too. ...They're a nice complement."

A description of the humanoid project and rubric can be found on Thorn's website at <http://departments.knox.edu/Humanoids>. Examples of some of her student's work can be found on the *Catch* website at <http://departments.knox.edu/catch/2009sp/roy-perspective.pdf>.