

THE AUTHOR FILE

Janet Thornton

Finding ways to navigate the reactions of life and herd tigers are all part of her workday.

The wealth of available sequenced genomes invites scientists to explore the molecular basis of life, to browse and parse the beautiful complexity of this now “open book,” says Janet Thornton.



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A physicist turned computational biologist, Thornton directs the European Bioinformatics Institute (EBI), where she has cultivated interdisciplinary teamwork since 2001.

She has authored around 400 papers and enjoys studying proteomes, metabolomes and the reactome—the “reactions of life,” as she calls them. “I just love what I do,” she says.

Thornton studied physics at the University of Nottingham and shifted to biophysics for her PhD at the UK’s National Institute for Medical Research. She has received many awards, including a British order of chivalry: for her services to bioinformatics, she has been named Dame Commander of the Order of the British Empire.

In her most recent work, she and her team developed EC-BLAST, a set of algorithms and a web service that allows scientists to quickly compare and contrast enzyme reactions. Scientists might use it to see the physiological reactions with which a potential drug might interact, for example. Knowing reactions matters: one compound might heal, another might harm—just, for example, because of stereochemical differences, meaning the positioning of atoms in the molecule.

EC-BLAST has been five years in “gestation,” Thornton says. The project brought together chemists and computer scientists who tested the algorithms on different groups of enzymes. “You learn by applying the tool to look at specific questions,” she says. Many of the algorithms had to be specifically developed. “Initially we didn’t have the tools to think in stereochemistry,” she says, referring to one example.

EC-BLAST is one of the EBI’s many web services. Scientists can download open-source software or use any of the many EBI tools online. “There’s no doubt that the magic is the people who are here,” Thornton says of the over 500 EBI staff members. Many of them

are dedicated to developing and maintaining services for the scientific community, including databases such as the genome portal Ensembl, the proteomic database UniProt and more, all of which requires strategizing for future research needs. “These resources don’t happen overnight; they’re big teams and they have to think carefully,” she says.

Fostering collaborative science internally and across organizational and national boundaries such as for the project ELIXIR—the European life sciences infrastructure for biological information, a pan-European infrastructure she has spearheaded to help scientists share data—is hard work, especially in times of fiscal belt-tightening. At times, Thornton says, the task can feel more like “herding tigers” than cats.

Overall she sees the role of computational biology shifting, she says. In physics, work by experimentalists led to theoretical lines of inquiry. Biology is in its data-gathering stage, and rapidly moving toward the ability to model processes such as the effect of a drug on the human body. “We’re only a fraction of the way towards being able to do that,” she says, but she believes the EBI’s resources help to create the “bedrock” for this capability.

Besides her passion for work, Thornton enjoys listening to music and cycling. For over three decades she has belonged to a book club in which members have remained constant. They recently decided to read and discuss the epic poem *Beowulf*.

A former postdoctoral fellow in the Thornton lab, Sarah Teichmann, who works on gene expression and protein complexes and who has a dual appointment at the EBI and the Sanger Institute, is grateful that her mentor exposed her to a vibrant computational biology community. Thornton helped Teichmann develop her own research identity and has remained a mentor post fellowship.

Despite her success and many accolades, Thornton always creates community and remains “down-to-earth,” says Teichmann. Thornton is a well-known and respected scientist who runs an institute and is a mother of two. “This type of role model is invaluable and has had a profound influence on me—I have two young daughters—as well as probably on many other researchers” Teichmann says.

At a gathering of Thornton’s ‘science family’ a few years ago with over one hundred attendees, Imperial College researcher Michael Sternberg, a long-time friend and collaborator of Thornton’s, summed up her career by calling Thornton the “mother of UK bioinformatics.”

Vivien Marx

Rahman, S.A., Martinez Cuesta, S., Furnham, N., Holliday, G.L. & Thornton, J.M. EC-BLAST: a tool to automatically search and compare enzyme reactions. *Nat. Methods* **11**, 171–174 (2014).

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