Research Profile
Mihaela Sabin – STEM Education for All

Associate professor of computer science Mihaela Sabin works to create education practices that engage the next generation of young scientists in active problem solving. Her research focuses on the professional development of STEM (science, technology, education, and mathematics) teachers, with the goal of ensuring that educators are prepared to engage with rigorous and relevant curriculum to meet the technological demands of the 21st century’s computing workforce.

Sabin leads the Ecosystem Computing Challenge, a hands-on initiative to empower students to become content creators through the use of technology. In partnership with New Hampshire’s NSF EPSCoR program, UNH Cooperative Extension, and other stakeholders from across New Hampshire, the Ecosystem Computing Challenge teaches students computational skills to build mobile applications that address contemporary environmental issues impacting the State. “This is an authentic learning experience for our students,” Sabin explains. “Our goal is to engage groups that have been traditionally underrepresented in computing, including women, ethnic minorities, English-language learners, students with disabilities, and those from economically disadvantaged backgrounds.” The Ecosystem Computing Challenge is supported by a five-year grant from the National Science Foundation.

Sabin’s work is based at UNH Manchester (UNHM), within a city that has the State’s largest urban public school district. Her passion for designing and implementing innovative education approaches was ignited by her own students. UNHM provides STEM scholarships to economically-disadvantaged local students; along with colleagues in student services and STEM programs at UNHM, Sabin initiated a learning community to support these scholars’ transitions to higher education. “At first, I was shocked to hear about their challenges outside of the classroom with poverty and single parenthood,” she says. “I realized early on that we have to pay attention to and learn from the culture of our students.”

Accordingly, Sabin’s research focus takes the unique identities of underrepresented students into account. Sabin stresses: “We need to shift our perspective from a cultural deficit model to a model that affirms the cultural richness that underrepresented students in STEM bring to their learning environment.”

Sabin believes that a single institution cannot solve the challenges around 21st century STEM curriculum development. The design of the Ecosystem Computing Challenge draws its expertise from both educators working in classrooms across the state and local business partners in STEM industries. “It is important to bring key stakeholders to the table from the beginning of a project, because each stakeholder has particular needs and offers different knowledge,” she explains.

Sabin sees a bright future for New Hampshire-based technology projects and for the field of STEM curricular development as a whole, citing what she calls the “incredible alignment” of agents of change that is occurring now.

Prior to managing the Ecosystem Computing Challenge, Sabin served as a member of the Education Committee of the New Hampshire High Tech Council, a group that endorses new STEM-related projects, provides resources to entrepreneurs, and publicly promotes New Hampshire as a great place to build a career in technology. The Education Committee works on ways to bridge the gap between the classroom and high tech industries to encourage the new generation of young scientists and engineers.
Sabin also is Faculty Director of UNH’s STEM Discovery Lab, a K-12 research and education center for students and their teachers. One of the Lab’s newest programs is Design-Make-Code, an interactive afterschool program for 6-8 grade students that links school-day academic math and science with enriched learning of computing and engineering in the afterschool hours. Students are introduced to the fields of computing and engineering through explorations, problem-solving, and engineering experiments. They create mechanical models with simple machines and mechanisms; design digital fashion with Scratch programming environment; create age-appropriate electronics with littleBits kits, and control age-appropriate robots, such as Finch the Robot, to test computational designs. Design-Make-Code, offered in partnership with Granite United Way’s BRING IT!!! afterschool program, is open to students in all four Manchester middle schools and especially welcomes students who come from backgrounds traditionally underrepresented in STEM fields.

By engaging all students in projects rooted in contemporary issues, Sabin’s work helps foster the sustainability of both the technical workforce and our natural environment. Her approach and philosophy is one of innovative collaboration that works to include everyone—students, teachers, and industry leaders—to ensure that the curricular approaches that are developed will meet the individual needs of all stakeholders involved, both now and in the future.

**Girls Technology Day**

“One stereotype that prevents girls from being interested in computing is about how technology professionals are perceived,” said Sabin. “Girls in middle school and high school imagine a lonely programmer working on a laptop, with little collaboration or communication with co-workers and team mates. Unfortunately, many girls see working in technology as kind of geeky and lacking meaningful social interactions.”

To change this perception and spark interest in technology-based careers, Sabin, along with other educators and the NH Department of Education’s Career Development Bureau, organized, created Girls Technology Day, an interactive conference for girls in grades 8 and 10 with an interest in the fields of technology. First held in 2013, Girls Technology Day has received such an overwhelmingly positive response that in 2015, two events were held so that more students would be able to attend.

**Learn more:**

Mihaela Sabin, Associate Professor of Computer Science and Coordinator of the Computing Technology Program [http://manchester.unh.edu/about/directory/442/Mihaela+Sabin](http://manchester.unh.edu/about/directory/442/Mihaela+Sabin)


STEM Discovery Lab at UNH Manchester [http://manchester.unh.edu/outreach/stem-discovery-lab](http://manchester.unh.edu/outreach/stem-discovery-lab)

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Story by Paige Belisle, with Michael Thompson and Lynnette Hentges 6/30/15