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World-Class Research: Biomedical Science Beyond Experimentation

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World-Class Research

Faculty and relationships with Maine's big-three research labs propel Colby's opportunities in biomedical science

Chris Krasniak '16 was at Mount Desert Island Biological Laboratory working to identify the role of a protein in the kidney's filtration system. In a nearby lab, an incoming Colby first-year was slipping tubes into centrifuges and readying animal samples to be identified genetically and added to a species database. "Yesterday we extracted DNA," explained Caitlin Farrington '18. "It's a long process."

Through ongoing and growing relationships with premiere research facilities including MDI Biological Laboratory, the Jackson Laboratory in Bar Harbor, and Bigelow Laboratory for Ocean Sciences in East Boothbay, Colby students are working closely with accomplished professors and researchers on groundbreaking biomedical projects that will prepare them for science at Colby and far beyond.

Down the road at the Jackson Laboratory, a sprawling genetics research facility, research assistant Dan Sunderland '14 was explaining his work on the possible genetic causes of glaucoma.

"I feel like I was very well prepared [at Colby]," he said. "Between the class work and the lab experiences that I was able to have, it's put me in a really great place to go straight into a position like this."

That path is expected to widen as Colby reaps the success of grants and donor funding and strengthens and builds its connections to three of Maine's world-class research facilities.

In June MDI Biological Laboratory was awarded an \$18-million grant to fund its work with Colby and a dozen other Maine universities, colleges, and research

facilities. That grant was the latest installment of an estimated \$5-6 million to come to Colby from the National Institutes of Health over the past 15 years, according to J. Warren Merrill Associate Professor of Biology Andrea Tilden, whose relationship as a research scientist at MDI Biological Laboratories goes back decades.

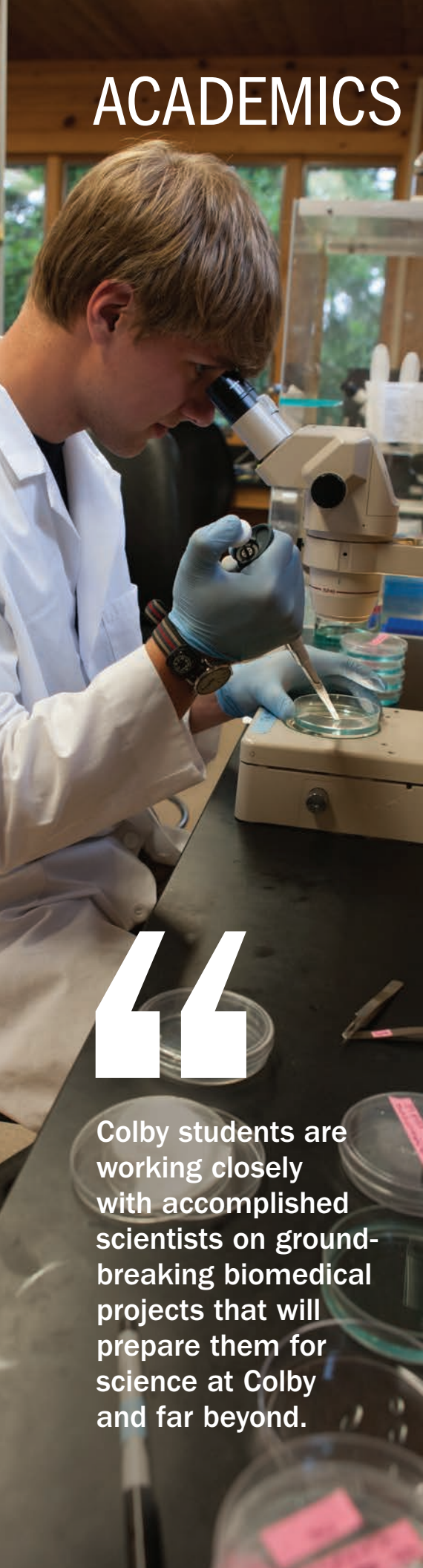
The connections to MDI Biological Laboratory and the Jackson Laboratory exist alongside Colby's partnership with the Bigelow Laboratory for Ocean Sciences, a formal relationship that offers a semester-in-residence program for Colby students.

Tilden has taught a Jan Plan at MDI Biological Laboratory for several years. Plans to bolster science research opportunities for Colby students at the Jackson Laboratory in coming years are underway. That advantage is coupled with dramatic advances in science technology that are helping biomedical study emerge at Colby the way environmental studies have over the past several years, Tilden said.

Opportunities like an upcoming Jackson Laboratory Jan Plan will allow for more faculty collaboration with colleagues at the research institutions, said Paul Greenwood, professor of biology and associate vice president for academic affairs. "There's a richness for our students and a richness for our faculty that a lot of small schools don't have." Greenwood said. "We're not in a big urban area, but we have these great biomedical institutions nearby. For a rural place, it's an unusual number of really good world-class institutions."



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—Melissa Glenn

COULD CHILDHOOD NUTRITION SET LATE-LIFE BRAIN FUNCTION?

Associate Professor of Psychology Melissa Glenn is interested in how our brains change as we grow old, and how we can prepare them for the future when we're young.

"We want to understand the impact of those early life experiences by investigating what neurological and behavioral functioning looks like in adulthood," Glenn said. "In particular, I'm interested in how the levels of certain nutrients in early life can set you on a protected trajectory."

Glenn and her students supplement the diet of pregnant rats with choline, a protein found in foods like broccoli and eggs. The focus of the research is ways in which prenatal choline organizes brain development and could reduce the likelihood of depression, schizophrenia, and other disorders later in life.

With a \$476,444 INBRE grant from the National Institutes of Health in 2010, Glenn has expanded understanding of the effects of nutrients on the brain. Her seminar and collaborative research course, Neural Plasticity and Behavior, and independent studies, have produced two published papers with student coauthors.

Glenn's project began with an award in 2008 from Support of Mentors and their Students in Neuroscience. She used that funding to hire a student researcher and collect data that was later used to secure the INBRE award. Last year she applied for and received a \$120,000 one-year extension of INBRE funding.

In left photo, Chris Krasniak '16 at work in the laboratory at Mount Desert Island Biological Laboratory, where he did research last summer on causes of kidney disease. At right, Sara LoTempio '16 at work in the Colby lab of Associate Professor of Psychology Melissa Glenn.

HITTING THE LAB RUNNING

When Dan Sunderland '14 led a tour of the lab where he works at the Jackson Laboratory, the group of Colby first-year science students watched and listened closely. He'd only graduated six weeks earlier, after all, and with any luck, Colby would prepare them equally well for a career in the sciences.

"Coming in here I found that it was weird how quickly it became normal," Sunderland said later, "how quickly I was able to start picking up the skills and how relatable some of the skills were that I learned at Colby."

AHMAD WINS GRANT FOR STUDY OF NEURODEGENERATIVE DISEASE

Assistant Professor of Biology Tariq Ahmad is in the hunt for the genetic causes of some of the most devastating neurodegenerative diseases: frontotemporal dementia (FTD), amyotrophic lateral sclerosis (ALS), and Parkinson's.

Ahmad, a neurobiologist, recently received \$500,000 in funding from the National Institutes of Health for his research, with Colby undergraduate researchers often serving as research assistants and coauthors of published papers.

"The projects in my lab have flourished because of undergraduate research," Ahmad wrote in his proposal to the NIH. "Recent publications from my lab and work with collaborators have prominently featured undergraduate students (mostly as first authors)."

For more on Ahmad's work, visit colby.edu/mag. 