Discoveries to Prevent Disease

Postdoctoral researcher Matt Goddeeris steps toward ways to prevent muscular dystrophy.

GRADUATE EDUCATION at IOWA

Spring 2014

POSTDOCTORAL RESEARCH: Matt Goddeeris, a UI postdoctoral researcher in molecular physiology and biophysics, is examining how the interaction between the protein dystroglycan and the enzyme LARGE could help prevent muscular dystrophy. Illustration from iStockphoto.

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Excellence in teaching
Geyer and Laronde win top mentoring honors

The University of Iowa Graduate College awarded Pamela Geyer and Michel Laronde top recognition for excellence in mentoring graduate students.

Geyer, professor of Biochemistry in the Carver College of Medicine, is the winner of the 2013 Graduate College Outstanding Faculty Mentor Award in biological and life sciences. Laronde, professor of French and Francophone Studies in the College of Liberal Arts and Sciences, receives the 2013 Graduate College Outstanding Faculty Mentor Award in humanities and fine arts.

The professors were nominated for the award by their students and colleagues.

Pamela Geyer
Geyer has played leadership roles in the Interdisciplinary Graduate Programs of Genetics and Molecular and Cellular Biology, and she is a long-serving director and co-director of the Medical Scientists Training Program.

“Much of my time as a faculty mentor has been spent on advising, critiquing, and cheering trainees as they navigate their training programs,” Geyer says. “I feel generously rewarded by these efforts. I have learned so much through mentoring and these insights have enriched my academic career.”

Michel Laronde
Laronde is known in the field of French and Francophone literature as one of the founders of the study of Arabo-French and Afro-French literature.

“My dynamic of mentoring is based on a one-on-one rapport,” Laronde says. “It evolves, expands, and contracts in unexpected and surprising ways and directions, depending on the personality and needs of the mentee.”

MICHEL LARONDE & COLLEAGUES. From left: Cinzia Blum, Professor of Italian Studies and Chair of French and Italian; Russell Ganim, Director of the Division of World Languages, Literatures and Cultures; Michel Laronde, Professor of French and Francophone Studies, Department of French and Italian; Anny Curtius, Professor of Francophone Studies, Department of French and Italian.
Kaan Certel is not always looking to hire the world’s foremost scientists to work at X-Chem Pharmaceuticals—a privately held biotechnology company based in Waltham, Mass. Certel, group leader of the cell biology division, often searches for a talented collaborator who possesses the best skill set for the job.

“In industry, we work as a group. It takes a great collaborative effort to get things done,” Certel says. “It’s very important that people can work with one another. If I feel someone will disrupt my group dynamics, I will push their CV back.”

Certel was an academic scientist as a Ph.D. student in the Interdisciplinary Graduate Program in Genetics at the University of Iowa. Like many of his colleagues in the biomedical and life sciences, Certel thought more about his thesis and course exams than the destination of his career path.

After earning his doctorate in 1999, Certel followed the typical academic trail, accepting a postdoctoral position at Massachusetts Institute of Technology (MIT). There, his career plan came into focus.

During his postdoc, Certel learned about other career options, including jobs in industry. “I wanted to be involved in science that had a more direct impact on people’s lives,” Certel says. “I wanted to do direct discovery.”

Certel is pleased to be working in industry, which he feels isn’t so far removed from academia yet allows him a more complete path from research to meaningful human impact.

“Whether your career is in academia or someplace else, you’re still a scientist,” he says. “It isn’t like academic science is the main track that we’re trained to do and all the other careers are what we do if this doesn’t work out. To me, they’re all equal possibilities.”

Advice for graduate students
Certel, alumni speaker at the 2013 Genetics Ph.D. Program Retreat last October in Iowa City, encourages doctoral students to start thinking about their professional future while in graduate school.

“What you do in graduate school is nowhere near what you’re going to do for the rest of your life,” Certel says. “People should start thinking about these things in graduate school, because a postdoc position is not necessary for everything, including industry. It’s not going to increase your likelihood of getting a job in industry, but it will get you started at a different position.”

Scientists also can establish valuable networking connections as a postdoctoral scholar. “You have to get to know people personally, but you also have to get those people to recognize your skills and accomplishments,” says Certel, who has also worked as a senior scientist at X-BODY Biosciences.

Certel’s industry role
X-Chem, Inc. was established in 2009 to apply its innovative drug discovery capabilities to new small-molecule therapeutics. X-Chem scientists provide their collaborators—the largest of which is AstraZeneca—with chemical compounds that could lead to drug development.

As the group leader in cell biology, Certel designs cell-based tests to evaluate compounds before animal studies are conducted. These chemical compounds may lead to drug discoveries to treat diabetes, cancer, infectious disease, and inflammatory disease.

“We aspire to increase the number of ‘shots on goal’ per target. Our chemical strategy can be applied broadly to any therapeutic area,” says Certel, who supervises a team of three scientists. “X-Chem has built a strong team of leading experts with proven track records in innovative drug discovery and biotechnology partnering. Science is very fast paced in industry. Priorities can change on a dime. I look for people who are capable of handling that sort of environment.”

Certel says X-Chem’s informatics department helps find better collaborative solutions for complex problems in drug discovery. Experts in informatics aid discovery processes through strategic use of computing power to make sense of large amounts of information. For companies like X-Chem, that means analyzing large amounts of data to find key details that might otherwise go unnoticed.

“This day and age, I can’t imagine science without informatics,” Certel says. “If I could go back to graduate school, the only thing I would do differently is learn more about programming.”
University of Iowa graduate students looking for career development opportunities attended a mini-conference, CAREERS OUTSIDE THE ACADEMY. Held on campus March 29, 2014, the half-day conference featured two lectures and two discussion panels.

Expanded market for Ph.D.s
Looking at an array of career options can lead students toward a successful job search and, ultimately, a rewarding and satisfying work life.

Students attending this session received an overview of popular alternative and non-academic careers. They learned useful job search tips and effective ways to market the transferrable skills gained in graduate school.

CV to resume: the basics
At this session, students learned how to turn an academic CV into a targeted resume for the non-academic job hunt.

Students reviewed sample resumes and received tips on effective wording and formatting.

Employees’ perspectives
Next, students participated in discussion with nine panelists, all successful graduate degree holders, who have established rewarding careers outside the academy or outside a faculty/research track in the academy.

Employers’ perspectives
Students had the opportunity to discuss careers with five progressive employers who hire Ph.D. and Master’s degree holders. The panelists offered insights on career preparation, including details about the transferrable skills they seek in their employees.

Watch the videos at www.IowaGradCareers

Discussion highlights
When you realized you wanted to find a career based on your interests in social justice, how did you begin your career search?

“I began by looking for volunteer opportunities in community organizations. That helped me chart the aspects of social justice work that interested me most.”
—Linda Kroon

What role did networking play in landing your current position? How do you build a professional network?

“I relied on luck. I want to encourage you not to rely on luck. Networking is something you should actively work on. Keep in touch with people. Keep your eyes open, even if it’s just a request to connect on LinkedIn. Networking doesn’t mean you have to push yourself on people. It can mean simply being aware of where your former grad school colleagues are.”
—Catherine Cocks

“You have skills. Don’t be afraid to say to people in networking situations, ‘These are the skills I have that might be useful in your field.’ You’d like people to notice your skills on their own, but most people don’t have time to do that. So tell people what your skills are and ask how those skills might fit with job openings in their field. They will remember you if you are a good fit.”
—Trina Roberts

Freedom in academia is choosing what problems you want to solve. To what extent is that possible outside the academy?

“If you have a vision and a passion for what you’d like to accomplish, you can often convince your boss of that. It’s like a needs assessment within your own company. You find what’s not being addressed well, and make a case to your boss to work on it. Apply for research grants, gain some experience and some data, and then pitch it to your boss. Refine your specialty or experiment with another specialty where you can apply your skills in a new area.”
—Kirk T. Phillips

Do any of you have outlets for teaching?

“Yes. Lots of opportunities are out there, but you have to find them rather than wait for them to knock on your door. If you know that’s something you want to do, there are adjunct opportunities, community college opportunities, K-12 opportunities, outreach, and online communities.”
—Trina Roberts

What would make you want to hire a Ph.D.?

“One of the things overlooked is passion for the work. There are people with great training who understand their craft well, but having the passion for a particular job and organization for which you’re applying is crucial.”
—Nancy Quellhorst
“The employers want to hire the best person. Do all you can to ensure they know you are interested in their company. There’s no excuse to fail to do some research on the company. Be able to tell them how YOU can solve a problem. That’s really the number one thing that they are looking for is to bring somebody on board who can help them with the issues they have at hand.” —DaLayne Williamson

“There are positions in the business/industrial/corporate world where a Ph.D. is an advantage. Often those are not entry-level positions, so you have to set your sights on the job two or three steps down your career ladder.
—Mark Weldon

“Companies appreciate the advanced degree when it’s in an area closely aligned with their business. For example, in my business we do food and beverage manufacturing, so industrial engineering, mechanical engineering, health safety environment, milling science, R & D in food science, nutrition—all these are important to the company’s mission. Target companies that have an interest in your area of expertise.” —Mark Weldon

### Employee Panelists

- **Allison Antes**  
  Workforce Strategist  
  Cedar Rapids Metro Economic Alliance

- **Jill Hugunin**  
  Vice President of Human Resources  
  Pearson

- **Lew Montgomery**  
  Career Coach  
  ACT

- **Nancy Quellhorst**  
  President  
  Iowa City Area Chamber of Commerce

- **DaLayne Williamson**  
  Workforce Business Services Director  
  Iowa City Area Development

- **Catherine Cocks**, Acquisitions Editor, University of Iowa Press  
  Ph.D., History, University of California, Davis

- **Catherine Hale**, Curator, University of Iowa Museum of Art  
  Ph.D., African art, Harvard University (2013)

- **Linda Kroon**, Director, Women’s Resource and Action Center  
  M.A., Choral Conducting, University of Iowa

- **Kirk T. Phillips**, Senior Health Research Scientist, Strategic Analytics, UnityPoint Health  
  Ph.D., Health Informatics and Epidemiology, University of Iowa (2005)

- **John Reyland**, Digital Communications Engineer, Rockwell Collins, Inc.  
  Ph.D., Electrical and Computer Engineering, University of Iowa (2011)

- **Trina Roberts**, Associate Director, University of Iowa Museum of Natural History  
  Ph.D., Committee on Evolutionary Biology, University of Chicago (2005)

- **Lewis Sanborne**, Associate Vice President, Noel-Levitz  
  Ph.D., Higher Education Administration, Illinois State University

- **Mark Weldon**, Resource Conservation Engineer, Quaker Oats  
  Ph.D., Environmental Engineering, University of Iowa (2007)
In a nomination letter to the Rhodes Scholarship Selection Committee, University of Iowa faculty member Horace Porter called Donald Brown a “true rarity” in academia.

Brown, who earned his B.A. from Mississippi State University this spring, spent the summer of 2012 at the University of Iowa as a SROP (Summer Research Opportunities Program) student. Porter was impressed by this up-and-coming scholar before he ever arrived on campus.

“He asked me for a reading list before he began the SROP Program. I assigned him Richard Wright’s autobiography Black Boy to get him started,” says Porter, UI professor of English who mentored Brown that summer.

“He devoured those 400 pages in three days and had a hunger for more. Once he arrived, his work ethic and discipline, combined with his intellectual imagination and professional ambition, set him apart.”

Brown has continued to distinguish himself academically. On Nov. 23, 2013, Brown was among 32 Americans selected to receive the prestigious Rhodes Scholarship from the Rhodes Trust. Applicants are chosen based on high academic achievement, integrity of character, a spirit of unselfishness, respect for others, potential for leadership, and physical vigor.

Rhodes Scholars receive two or three years of study at the University of Oxford in England. The estimated value of the scholarship is $50,000 per year.

“Being able to go there is huge. There is nothing that can match it,” Brown says. “My parents raised me to always work hard. Whatever I do, I give it my all.”

Brown, who majored in English and philosophy at Mississippi State, wrote his senior thesis on Ralph Ellison—a scholar and writer best known for the 1952 landmark novel Invisible Man. Brown shows how politically radical novelists were forced to mute their political ideas to become visible and respected.

The UI SROP experience

At the UI, Porter conducted a small seminar on Ellison for Brown and fellow SROP scholar Jordan Gaither. Porter assigned the students essays written by Ellison and required them to write and revise two short responses per week.

“It was a genuine pleasure to read the essays and suggest revisions. We also met and discussed the essays twice a week,” Porter says. “This meant that Donald Brown learned a lot about Ellison. And given how well he took and understood editorial advice, his writing quickly began to improve.

“I’m sure that his future work on Ellison and other writers will be significant. I believe we are seeing him at the start of a remarkable career as a scholar/writer. It is an unprecedented honor and
rare privilege to know someone like him.”

As Brown became a scholar of Ellison at Iowa, he developed a deep appreciation for his mentor.

“I learned a lot from Dr. Porter. I never had a go-to mentor, and Dr. Porter showed me how important mentorship is,” Brown says. “By taking time out of his day to eat with me, join me at a coffee house, and talk with me about being a black scholar in America, he showed me being a professor is something I want to do. I want to do it like he does it.”

Despite being over 700 miles from his hometown of Vicksburg, Miss., Brown felt at home at the University of Iowa, thanks in large part to SROP Coordinator Diana Bryant.

“(Diana Bryant) was like a mom up there. I still keep in touch with her,” Brown says. “Anytime I needed anything, I could come to her office. She even invited me to go to church with her on Sundays. That was my first time staying away from home for a long period of time, so I needed someone like her.”

An award-winning program

The University of Iowa’s SROP is an award winning program designed to provide underrepresented undergraduate students with first-hand exposure to the graduate school experience and to faculty life. The students are paired with a faculty mentor whose work is closely related to their academic interests and career goals.

The Committee on Institutional Cooperation (CIC) oversees the SROP at its member universities. The University of Iowa has offered SROP since 1986.

According to CIC data from 1986-2012, the UI ranked second in the percentage of degrees earned by students who participated in SROP at their university. Iowa had an 18.8 percent completion rate, trailing only the University of Chicago at 19.3 percent. Including students who were enrolled in graduate school but had not yet graduated, Iowa ranked first in the CIC with a 43.2 percentage. Ohio State was second at 40.4 percent.

“The Graduate College’s SROP program and its director, Diana Bryant, deserve considerable praise for providing excellent minority students the opportunity to study and do research with Iowa faculty members,” says Porter. “I hope Donald Brown’s selection as a Rhodes Scholar will let everyone know that students greatly benefit from this mentoring program.”

For more about UI’s SROP, visit the Graduate College’s Office of Graduate Inclusion online: www.ogi.grad.uiowa.edu
Brian Joseph-Keysor Miller’s dissertation connects the political, social, and economic histories of three countries—Turkey, Germany, and the United States.

Miller, a doctoral student in history, examines the post-World War II West German guest-worker program that employed Turkish citizens.

The United States wanted West Germany to be rebuilt as soon as possible after World War II, because it would provide a strong bulwark against the Cold War threat of communist Russia. The Marshall Plan, a series of economic strategies and reforms initiated by the U.S. to rebuild post-war Europe, helped fund the rapid economic recovery in West Germany that in turn led to the need to import guest-workers to fulfill the increased industrial demand.

Turkish officials wanted models to spur economic and social development in Turkey and saw a great opportunity in a labor migration plan designed to temporarily send workers abroad to receive training and employment. The workers were expected to return home to invest their money and newly-acquired knowledge in Turkish industry.

As it turned out, labor migration did not go as planned, short-circuiting economic development in Turkey. The most successful Turkish entrepreneurs often stayed in Germany, while those who were less successful more often returned home.

“I look at how the narrative of modernization theory in the 1950s U.S. academy filtered to—and was taken up by—Turkish state planners as they sought successful development strategies,” says Miller, whose dissertation advisor is Professor Paul Greenough.

“Modernization theory was a response to Marxism—a model that was no longer an acceptable development tool in the Cold War U.S. But modernization theory was rather superficial and conceived in ideological terms.”

Lessons from the past

Miller says there are lessons to be learned from the failure of the West German guest-worker program in Turkey.

“One of the reasons I am interested in the history of migration and development is in the hope that we can move towards more just and verdant programs in the future,” Miller says. “Program planners should take time to understand a particular plan’s applicability to the unique contexts of different societies. Development policy is not ‘one size fits all’ and should be offered in the best interests of a particular society and certainly not in the interest of another’s foreign policy.”
Funding for research

Miller’s research in Turkey included studies of Turkish archival documents and interviews with Turkish citizens in their native language. He was able to pursue such a thorough examination of the German-Turkish Guest Working Program because he earned several key external fellowships, as well as internal awards from the University of Iowa.

External funding

Miller won fellowships from the Institute of International Education and the Institute of Turkish Studies in Washington D.C., a German Academic Exchange Service Scholarship, and a U.S. Department of State Critical Language Scholarship.

UI funding

Miller’s internal awards include a T. Anne Cleary International Research Fellowship, a Graduate College Summer Fellowship, and a Department of History Graduate Fellowship.

Funding strategies—a Q & A

Q You have received several fellowships as a graduate student. What is your success rate in earning funding?

A I maybe get 1 out of every 5 fellowships that I apply for. You should apply for a wide spectrum of funding. Whenever you apply for a fellowship and don’t get it, you should ask for critiques [to help you understand] why you didn’t get it. Then, you can learn from that and write a stronger application next time. You need perseverance. This is a marathon, not a sprint.

Q Do you have any tricks of the trade for securing external funding?

A You need to tailor your application to the funder’s mission statement. You need to research the funders. It’s not enough to have one solid application that goes out to everybody.

I also learned that little money leads to big money. The more small fellowships you’re able to get gives you a better looking CV. Then you are more likely to get a big one.

Q When should you apply for fellowships?

A You have to be a cycle ahead. When you’re thinking about academic year 2015-16, you should start planning before you get into calendar year 2015.

Q Have these tough economic times made it more difficult to find external funding opportunities?

A There’s less funding. It’s getting tighter and tighter, but with perseverance and some good luck you’re able to find your way through. There are seats at the table, just less seats at the moment.
You finish a hard workout in the gym and every muscle in your body aches. No worries, your muscles are regenerating and soon will be good as new.

However, as we age, this regeneration process becomes less efficient. Patients with muscular dystrophy have a much grimmer prognosis. They live with this muscle weakness daily and eventually lose the ability to do the things most people take for granted, like walk up a flight of stairs.

Matt Goddeeris, a postdoctoral research scholar in molecular physiology and biophysics at the University of Iowa, is examining how the interaction between the protein dystroglycan and the enzyme LARGE could help prevent muscular dystrophy.

—Continued on page 16.
STEPPING TOWARD PREVENTION: Postdoctoral researcher Matt Goddeeris looks at muscles at the molecular level to find ways to prevent muscular dystrophy. Illustration from iStockphoto.
How it works

How could the interaction between the protein dystroglycan and the enzyme LARGE help prevent muscular dystrophy?

LARGE creates sugar chains (see red chains in graphic above)—also known as LARGE-glycan repeat chains—on dystroglycan in the extracellular region of the cell, enabling dystroglycan to engineer a strong extracellular environment during muscle regeneration.

In some patients with muscular dystrophy, having fewer “links” on the sugar chain causes a weaker extracellular environment, and muscle is more prone to injury.

In a paper published in Nature (2013), Goddeeris and his colleagues showed in mouse muscle that a coordinated increase in the cellular makeup of LARGE and dystroglycan facilitates rapid extension of LARGE-glycan repeat chains, thus providing normal skeletal muscle function.

“When a cell changes into another type of cell, many sugars on its surface are going to change,” Goddeeris says. “If you have a disease, the sugars coating your cells are also likely to change. We are just starting to understand why that’s important. We have a new model for how this protein dystroglycan works.”

Dystroglycan model

Muscle is different from most other tissues in the body in that it requires dystroglycan to have a long LARGE-glycan repeat chain. Goddeeris and colleagues discovered why muscle requires this by, in part, using synthesized LARGE-glycan repeats to show a direct correlation between LARGE-glycan extension and its binding capacity to extracellular ligands. A ligand is a substance that binds specifically and reversibly to another chemical entity to form a larger complex.

Goddeeris says dystroglycan performs multiple functions that contribute to a strong extracellular matrix in muscle tissue.

“This protein dystroglycan isn’t just binding to the extracellular matrix. It also helps to organize the proteins of the extracellular matrix so that they can help muscle resist damage,” Goddeeris says. “By changing this outside environment, the cell is able to modify where it lives. The cell is engineering its own environment by changing the length of this sugar on dystroglycan.”

How this helps patients

What does this mean for patients with muscular dystrophy?

“These experiments tell us that the length of the LARGE-glycan in patient muscles is important, and this tells us why some patients’ diseases are more severe than others,” Goddeeris says.

“Some patients are able to make the right amount of sugar when the muscles are being formed, but they’re just not able to maintain it for the lifetime of the muscle fiber. Those patients are building muscle with the right extracellular environment, and might have a less severe form of the disease as a result.”
MATT GODDEERIS

UI postdoc experience

Goddeeris works with a successful scientist at Iowa—Kevin Campbell, Howard Hughes Medical Institute investigator and professor of molecular physiology and biophysics. In Campbell, Goddeeris has found a mentor who encouraged independent thinking and solid research skills.

“My research has been my own ideas. If you’re going to be successful, you have to come up with your own ideas,” Goddeeris says. “My mentor has been really good at identifying key experiments I would need to get a high profile paper published. It doesn’t mean anything unless you can get it published.”

While publishing is important, applying for and getting grant funding is also a necessary, and different, skill. Succeeding in both arenas requires a clear understanding of the communication goals at hand.

“For a grant proposal, you’re trying to sell the grant reviewers that this is a useful idea and you have the skills to do it,” Goddeeris says.

“For a manuscript, you want to be bold in making a statement, and then follow it up with the right, convincing experiments.”

Next career step

As Goddeeris nears the end of his postdoctoral appointment, he is looking to the future.

After interviewing for jobs in both academia and industry, Goddeeris accepted a position at Mitokyne, a biotechnology company in Cambridge, Mass. Mitokyne discovers and develops new small molecule modulators that boost mitochondrial functions.

Goddeeris will start at Mitokyne in July.

Goddeeris and his colleagues showed in mouse muscle that a coordinated increase in the cellular makeup of LARGE and dystroglycan facilitates rapid extension of LARGE-glycan repeat chains, thus providing normal skeletal muscle function.
Lauren Haldeman has built plenty of websites. However, creating the site for the University of Iowa’s first MOOC (Massive Open Online Course), Every Atom: Walt Whitman’s Song of Myself, was a bit daunting.

Haldeman, webmaster for the UI’s Writing University, sailed in unchartered waters with this popular project, which had 2,145 participants for the course’s first session on Feb. 17.

The six-week course ran through March 29 and was organized by the UI International Writing Program (IWP). Participants had the opportunity to read, consider, and discuss Whitman’s epic poem through video lectures, live breakout sessions, and moderated online discussions.

Haldeman was the person behind the scenes who made sure the class ran smoothly.

“Getting this site up and running was a huge learning experience for me in terms of the skills I use and the way I build sites,” says Haldeman, a Graduate College staff member. “Every time I build a site, I learn something. Part of the fun for me is figuring out how to make it secure, how to make it accessible to everyone, and how to allow people to move through it and learn without the site getting in the way.”

Whitman Scholar Ed Folsom and IWP Director Christopher Merrill co-taught Every Atom. Folsom is the Roy J. Carver Professor of English and co-director of the Walt Whitman Archive. Merrill directs the IWP; he is also the author of six collections of poetry and a member of the National Council on the Humanities.

Haldeman also got behind the camera. She helped record 10-minute videos of Folsom and Merrill talking about Whitman and Song of Myself at Shambaugh House and the Lindquist Center and posted them on the course website.

“Listening to Ed talk is like a spiritual event. The way he talks about Whitman is incredible,” Haldeman says.

Making a MOOC

Drupal 7 is the content management system for the course. While Haldeman is well-versed in Drupal, she had never created a MOOC.

Haldeman consulted Annette Beck and Maggie Jesse at UI Information Technology Services (ITS) about how the website should look, how it would interact with ITS, and what guidelines needed to be followed.

“This is new to all of us. They told me to build it in Drupal and we’ll see how it works,” Haldeman says. “How do you structure it, how do you make it work, and how do you take people who enrolled in the course and track their progress? I had to figure all of that out.”

Custom-built

Haldeman believes in treating information carefully, placing the material front and center in her design. If the website gets in the way, there’s something wrong. She had to work at avoiding such a problem while creating the enrollment page of the site.

“In the first design, when you enrolled, you were taken to a nearly blank page that contained the course session and a weird listing of the sessions,” Haldeman says. Rather than using a standard page, she opted to customize, replacing the default page with one of her design. “Now, when you enroll, instead of going to that weird blank page, you go to a more informative Getting Started page.”

“Lauren has created an elegant design for these websites that are simple to use, functional, and quite dynamic,” Merrill says.
The course structure
Each week, two video sessions were posted, each organized around a central theme. After each session, Folsom and Merrill posed questions to participants, encouraging them to share their answers in the discussion forum.

Folsom, Merrill, and the course’s teaching assistants—Micah Bateman, Stephanie Blalock, Blake Bronson-Bartlett, and Timothy Robbins—guided the discussion and answered questions in the forum. At the end of the week, the teaching assistants held a live breakout session to examine the week’s themes. One live breakout session had 713 members.

More courses
A second MOOC, How Writers Write: Talks on Craft and Commitment, is being offered by the International Writing Program in two sections. This course will utilize the same website designed by Haldeman.

The first section, held this summer, features a collection of short, intimate talks created by poets. The second section, held this fall, will showcase talks created by fiction writers. Merrill contextualizes these video talks through lecture materials and online discussion, while contributing authors offer live question-and-answer sessions to course participants.

Merrill is pleased to have MOOCs as part of the UI’s educational offerings.

“Trees were an initial feeling that MOOCs would replace the bricks and mortar (of education). That was overblown,” Merrill says. “People then saw a huge attrition rate in MOOCs. Actually, MOOCs are using the resources of the web in a blended fashion to bring the genius of a research university to a broad range of people around the world.

“How in a UNESCO City of Literature, everyone can’t come and study literature. But with a MOOC, they can take advantage of the magic of Iowa City and the University of Iowa.”

Ed Folsom agrees that the UI Writing University’s MOOC format is a solid and compelling learning environment.

“Lauren Haldeman was the wizard behind the curtain of this MOOC,” says Folsom. “The course was a great success and drew rave reviews from the students, many of whom took part on the twenty-four-hours-a-day, seven-days-a-week discussion forum, which was both exhausting to keep up with and exhilarating to read.

“But the key was that there was never a glitch. All the elements of the course—the class sessions, the assigned readings, the recordings of the poetry, the discussion forums, the live breakout sessions—worked seamlessly, thanks to Lauren’s innovative design.”

Your portal to great writing: Browse lectures, videos, and discussions at courses.writinguniversity.org.
Emanation is a technique used to separate gas from fluid. Through emanation, radon-222 gas (the first decay product of radium-226) is bubbled out of fluids and counted for radioactivity. The radioactivity of radium-226 in a fluid can be estimated from the radioactivity of radon-222.

Gamma-ray spectroscopy is an analytical technique that can be used to identify various radioactive isotopes in a sample. In gamma-ray spectroscopy, the energy of striking gamma-rays is measured by a detector. By comparing the measured energy to the known energy of gamma-rays produced by radioisotopes, the identity of the emitter can be determined.

EPA method 903.0 covers the measurement of the total soluble radium radioisotopes in drinking water. This method provides for the separation of radium from other water dissolved solids in the sample.
Research by a University of Iowa graduate student suggests gamma-ray spectroscopy may provide a more accurate measurement of radium in byproduct water produced by hydraulic fracturing, compared with other methods of analysis.

Hydraulic fracturing, or fracking, is a method for extracting natural gas by injecting large volumes of water at high pressure to increase the total surface area exposed in deep rock formations. To free the gas, a mixture of water, sand, and chemicals is injected deep underground into wells vertically at extremely high pressure. The pressurized fluid mixture fractures the rock and allows the natural gas to rise to the surface through the recovered water—called flowback water (FBW).

Although fracking technology has been employed for decades to improve gas extraction in vertical wells, more recently fracking has been combined with unconventional (horizontal) drilling to dramatically increase the potential for natural gas extraction in the United States and around the world. As a result, the practice is proliferating rapidly on a global scale.

In a paper published online in Environmental Science & Technology Letters, first author Andrew Nelson, a Ph.D. student in the University of Iowa's Interdisciplinary Graduate Program in Human Toxicology, and colleagues examined the effectiveness of several methods of measuring radium levels in FBW.

The study was conducted using a 55-gallon drum of FBW from the Marcellus Shale Region in northeastern Pennsylvania. The sample was extracted from a 2,100-meter deep, horizontally drilled well that was hydraulically fractured.

Nelson, a Presidential Graduate Research Fellow, and his team investigated the effectiveness of several types of common radium analysis methods, including gamma-ray spectroscopy, emanation techniques, and EPA method 903.0.

The researchers found that a high salt concentration in the FBW sample interferes with the EPA wet-chemistry method traditionally used for drinking water analysis. They also discovered that gamma-ray spectroscopy and emanation techniques are not as affected by the high salt concentration, allowing for more accurate radium readings.

“At the moment, in the literature, there are government agencies that are either using or proposing methods that we have found don’t work as well as gamma ray spectroscopy,” says Nelson. “We think it’s important that methods used most accurately assess the radioactivity of samples.”

Using gamma-ray spectroscopy, they identified levels of radium-226 (a radioactive metal produced by the radioactive decay of uranium) 1,000 times higher than would be allowed in drinking water, according to EPA regulations.

The authors say the research can help guide regulatory agencies in determining the best methods for analyzing FBW, establishing safeguards for fractural hydraulics operations, and safely disposing of byproducts from the process.

The U.S. Nuclear Regulatory Commission (NRC-HQ-12-G-38-0041) and Environmental Management Solutions (EMS FP 07-037-43) provided funding in support of the research.

In addition to Nelson, the research team included Michael Schultz, UI assistant professor of radiology in the Free Radical and Radiation Biology Program and senior study author, Dustin May and Marinea Mehrhoff of the University of Iowa State Hygienic Laboratory; Andrew Knight and Eric Eitrheim, UI graduate students in chemistry; Robert Shannon of Quality Radioanalytical Support, LLC in Grand Marais, Minn.; and Robert Litman of Radiochemistry Laboratory Basics in The Villages, Fla.
Nathan Peterson realizes natural disasters will be part of his life forever.

“I was downtown when the tornado struck the University of Iowa campus in 2006, and the flood of 2008 left me stranded with family members for almost a week,” recalls Peterson, a Ph.D. student in art history at the UI. “My cousin lives in Joplin, Mo., where the unprecedented tornado struck in 2011, and the drought of 2012 severely affected my family’s farm in Nebraska.”
Peterson’s research focuses on how the March 2011 Japanese tsunami affected the religious culture of communities on the Sanriku coastline of Japan. Peterson conducted his field work from June 2011 to March 2012 while living in Miyako. A coastal city exposed to the Pacific Ocean in northeast Japan, Miyako saw much destruction during the recent tsunami.

—Continued on next page
Peterson examines the role of religious institutions—Buddhist temples, Shinto shrines, and “New Religion” churches—immediately following the tsunami as well as during the slow recovery process in nearby coastal communities.

The devastation of these religious institutions and the temporary altars constructed by people to memorialize their loss illustrate the scope of the disaster in Northeast Japan. Peterson’s research illustrates how certain religious practices kept the communities together when social and civic institutions were at their weakest.

“Despite the notion that many Japanese people are non-religious, these religious institutions benefitted the communities in tangible ways because they are integral to their identities,” says Peterson, who received a 2012 Graduate College Summer Fellowship. “Moreover, these communities need long-term support in order to overcome the effects of the disaster. My priority is to increase awareness about the needs of the communities in Japan affected by the disasters.”

Peterson wrote a chapter based on his research in the book Japan Copes with Calamity: Ethnographies of the Earthquake, Tsunami and Nuclear Disasters of March 2011, published by Peter Lang International Academic Publishers on Oct. 30, 2013. This book is the first collection of ethnographies in English on the Japanese communities affected by the giant Tohoku earthquake and tsunami of March 11, 2011 and the ensuing crisis at the Fukushima nuclear power plant. This volume offers insights into the social fabric of rural communities in Northeastern Japan and suggests ways human response to disaster may be improved in the future.

Peterson’s chapter is titled “Adapting Religious Practice in Response to Disaster in Iwate Prefecture.”

“I am most awed by the Dream Lantern festivals that the community held twice while I lived there. The paradox is that, while the disaster has torn the fabric of many families, people also saw a greater urgency to stick together during holidays and times of remembrance.”

Temporary memorial with the Hinomaru (Rising Sun flag) constructed on the Fujiwara homesite, Otsuchi, August 2011. Photo by Nathan Peterson.

“Temporary shrines served as coping mechanisms for people to remember their loss, and they reunited neighborhoods by being landmarks in an otherwise difficult landscape.”

The Dream Lantern festival held in Miyako, August 2011. Photo by Nathan Peterson.
Q How have families been impacted by and responded to the tsunami?

A The tsunami is probably the greatest factor in the change from extended family households to nuclear or even single-parent families. The community remembers tsunamis of the past as being hardships, but this tsunami has exacerbated the population decline of this area. Besides the loss of loved ones, this situation has the greatest impact on families. I am most awed by the Dream Lantern festivals that the community held twice while I lived there. The paradox is that, while the disaster has torn the fabric of many families, people also saw a greater urgency to stick together during holidays and times of remembrance.

Q Why are temporary shrines important to the recovery efforts of the Japanese people?

A Most of these shrines and temples are centuries old and built in areas once thought to be safe from any tsunami, but March 2011 changed this understanding. The revitalization of shrines and temples represents the recovery and rebuilding of communities in the disaster areas much like the reintroduction of an endangered animal into the habitat reflects the stability of an ecosystem. Temporary shrines served as coping mechanisms for people to remember their loss, and they reunited neighborhoods by being landmarks in an otherwise difficult landscape.

Their necessity was especially relevant during the first year when most local temples, shrines, and “New Religion” churches were closed because of the tsunami. They varied in composition, but the common trait shared by all was that they resembled Buddhist altars. I would say that the syntax was Buddhist while the diction was left to the individual’s imagination.

Q How has the community recovered emotionally and structurally from the tsunami?

A The cleanup was swift in Miyako, but several communities south of the city were still in disarray when I left in March 2012. Last summer, some of the neighborhoods where I conducted research had little development. People are unwilling to rebuild and plans for the community are met with skepticism. The gardens planted in the reclaimed plots are the most impressive structural improvement.

Emotionally, I would say that people are in high spirits because, in some part, hopes for effective governing after years of paralysis in Tokyo lead some to believe that officials will see through their promises to rebuild.

A test of their emotional well-being is how people will feel three to five years after the disaster. Some people whom I interviewed say that life there will return to normal somewhere between 10 to 15 years while others recognized that life would never be the same.

Q How has this research experience changed you as a scholar and as a person?

A My experience in Miyako changed my perspective as a scholar because I feel compelled to research the long-term recovery efforts and the overall cultural tendencies of Northeast Japan. These issues are important for people to understand.

Disasters reveal the underlying structure of any community, its cultural practices, and its relationship to political power, urging people to find greater meaning in their lives by embracing the ideas and values of what their communities represent.

I understand disasters and emergencies differently and encourage the greater public to take steps to be prepared for a situation when basic services are disrupted for a period of time. Having a readily accessible emergency kit is an obvious suggestion, but I also recommend participating in neighborhood organizations in order to instill a greater sense of belonging that can be of use during emergencies. I would dissuade people from helping during a disaster without first considering the impact of their presence because it could worsen the situation by taking away resources people need.”
Kyle Moody
2013 Summer Fellow
2013-14 Ballard Seashore Dissertation Year Fellow
Ph.D. in Journalism and Mass Communication (2014)

“Funding opportunities from the Graduate College were essential in my completion of my doctorate,” says Moody. “The Ballard Seashore Fellowship gave me the chance to focus on my research and complete my dissertation in a timely fashion.”

Graduate College funding helped Moody prepare well for his job search. He pursued and successfully landed a position as assistant professor in communications media at Fitchburg State University in Fitchburg, Mass.

“The fellowship meant I could focus on searching for an academic position while writing, and as a result I was able to craft polished application materials.”

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