



The University of Georgia

AI Newsletter

Institute for Artificial Intelligence
The University of Georgia
Athens, GA 30602-7415 U.S.A.

Fall 2013

IAI Welcomes New Associate Director

After many years as associate director of the AI Institute, **Dr. Michael Covington** retired from UGA in June. His successor is **Dr. Frederick Maier**, an AI graduate and frequent collaborator with the Institute. For his master's and doctoral work, Dr. Maier was supervised by **Dr. Donald Nute**, one of the founding members of the UGA AI group and the AI Center's first director.

Dr. Maier's research is in logic in artificial intelligence, particularly knowledge representation and defeasible reasoning. He has a PhD in computer science from UGA, and prior to joining the Institute as associate director, he was a lecturer in UGA's computer science department. He has also been a postdoctoral researcher at Aston Business School in Birmingham, England and at the Florida Institute for Human and Machine Cognition. Before pursuing artificial intelligence, Dr. Maier studied philosophy at Tulane University in New Orleans.



Dr. Fred Maier

Perdisci Receives NSF Grant, Franklin Award

In December, **Dr. Roberto Perdisci**, Assistant Professor of Computer Science and AI faculty member, was awarded the M.G. Michael Award by the Franklin College of Arts and Sciences. The award, which recognizes excellence in research, has been given annually since 1944. **Dr. Charles Cross**, Professor of Philosophy, received the award in 2010.

Earlier in the year, Dr. Perdisci and CS Professor **Kang Li** received \$298,854 in NSF funding for their project "EDU: Enhancing and Broadening Computer Security Education with Stepwise and Reusable Problemsolving Challenges". The project, which runs until 2015, will improve computer security education by developing tools and educational materials to be used throughout the entire computer science curriculum.

IAI Receives Georgia Power Grant

The Institute has received \$46,613 from Georgia Power to fund the project "Solar Generation Prediction Using Computational Intelligence Models". Accurate predictions influence decisions about where to establish solar energy collection and electricity generation facilities. The predictions in turn rely on historical observations of weather variables (including air temperature, relative humidity, rainfall, wind speed, solar radiation, and vapor pressure). The research project will assist Georgia Power achieve their target goal of 210 megawatts of contracted solar capacity within the next two years. The project will be directed by **Dr. Don Potter** (with **Dr. Ron McClendon** and **Dr. Gerrit Hoogenboom**), and AI graduate students **Caitlin Cassidy** and **Maulesh Trivedi** will participate as research assistants.

Possible Cost Sharing Initiative

The Institute is currently evaluating plans which might drastically affect research and research students in the Institute. Specifically, the Institute is considering arrangements in which it would share the cost of funding graduate students with industrial partners and with faculty members in affiliated departments. If, for instance, a faculty member in an affiliated department is awarded a grant and wishes to partially fund an AI student, or if an industrial partner wishes to do so, then the Institute would consider contributing financially as well.

If members of the UGA AI community, whether part of the University or working in industry, are interested in participating or would like further information, please write either Dr. Potter (potter@uga.edu) or Dr. Maier (fmaier@uga.edu).

Faculty of Robotics Colloquium

In November, the newly established Faculty of Robotics (headed by AI faculty member **Dr. Prashant Doshi**), held its first colloquium, welcoming guest speaker **Dr. Henrik Christensen**. Dr. Christensen is the KUKA Chair of Robotics at Georgia Tech's College of Computing and also director of Georgia Tech's Institute for Robotics and Intelligent Machines. His research focuses on systems integration, human-robot interaction, mapping, and robot vision. While at UGA, Dr. Christensen spoke on the future of robotics as well as recent federal initiatives to advance robotics R&D in the United States.

UGA CS program accredited by ABET

Over the summer, a commission of the Accreditation Board for Engineering and Technology (ABET) met and awarded full accreditation to the Bachelor of Science program offered by UGA's Computer Science Department. This is the first time the department has applied for accreditation. It will last for 6 years, the maximum period possible. This is good news for the department, which is currently expanding. It recently added an additional lecturer and is in the process of hiring two tenure-track assistant professors.

New UGA Engineering degree programs

Fall 2013 marks the first semester for UGA students pursuing undergraduate degrees in mechanical engineering and electrical & electronics engineering. Though the University has offered degrees in agricultural and biological engineering for many years, a new College of Engineering was formed last year and has grown quickly since then. AI faculty members **Dr. Takoi Hamrita**, **Dr. Changying Li**, and **Dr. Gerrit Hoogenboom** are all associated with the College.

New Cognitive Science Student Association

A Cognitive Science Student Association was formed this semester, with students **Hannah Harrison** and **Rae Ann Saulnier** serving as co-presidents. The association is intended to increase awareness and understanding of the field as well as provide a meeting venue for UGA cognitive science students. The cognitive science major has grown in popularity over the last few years. There were 98 students in Fall 2012, up from 54 in 2009. Dr. Potter has said that the students he's interacted with recently are among the best he has ever seen. The new student association may be reached via cssa.uga@gmail.com.

New Faculty Research Cluster

This past August, the Office of the Vice President for Research announced the formation of six new Faculty Research Clusters. These are intended to support interdisciplinary groups of faculty to address research issues in the arts and humanities. Among the clusters is the Digital Humanities Initiative, co-directed by **Dr. William Kretzschmar** (Harry and Jane Willson Professor in Humanities). The initiative, which in part consists of a Digital Humanities Lab, is intended to strengthen the University's commitment to digital humanities and digital humanities research.

New AI Faculty

In addition to a new associate director, the Institute welcomed two new faculty members in 2013.



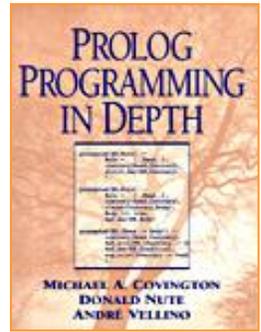
Dr. Changying Li is an Associate Professor in the College of Engineering. He received a PhD in Biological and Agricultural Engineering from Pennsylvania State University, and he came to UGA in 2007. His research interests include sensing and automation for specialty crops and cotton.



Dr. Ismailcem Budak Arpinar is an Associate Professor of Computer Science at UGA and a member of the Large Scale Distributed Information Systems (LSDIS) Lab. He received his BSc, MSc, and PhD degrees from the Computer Engineering Department of Middle East Technical University, and he came to UGA in 1998. His current research interests include the semantic web, crowdsourcing and collective intelligence, and information fusion.

UGA AI Textbooks Online

Free electronic versions of both **Prolog Programming in Depth** and **Natural Language Processing for Prolog Programmers** are now available for download. Both books—the first written by **Don Nute, Michael Covington, and Andre Vellino**, the second written by Dr. Covington—have long been used in classes at UGA (and will not easily be forgotten by AI graduates). The copyright has reverted to the authors, who have kindly made them available. They may be downloaded from the IAI and Covington Innovations (www.covingtoninnovations.com) websites.



Formation of Computational Linguistics Group at UGA

This past semester, a new research group in computational linguistics formed at UGA. *CompLing@UGA* meets every week and consists of faculty, graduate students, and undergraduate students from a number of disciplines across campus. The group is currently working with AI faculty member **Dr. Janine Aaronson** on sentiment analysis of financial documents. For more information about the group, contact **Dr. Bill Hollingsworth**, billh@uga.edu.

AI Alumna Uses fMRI to Study Consciousness in Nonresponsive Patients

This summer, a research study led by UGA AI alumna **Dr. Lorina Naci** made international news, with articles appearing in *The Globe and Mail*, *The London Free Press*, *New Scientist*, and elsewhere. Dr. Naci used fMRI machines to monitor the brain activity of patients in minimally conscious or vegetative states while the patients were asked a series of yes-no questions. Analysis of the activity indicates that some patients, despite exhibiting no outward signs of consciousness, are able to selectively respond to auditory stimuli. The research, published in *JAMA Neurology*, advances our understanding of consciousness and opens up the possibility of methods of communicating with patients with severe brain injuries.

Dr. Naci received her PhD from Cambridge University and is now part of the Brain and Mind Institute at Western University in Ontario.

Letter from the Director

Welcome back to the IAI newsletter! As you can see, things are a little different. You may recall that Michael Covington retired this past June, and after an intensive search Dr. Fred Maier (2002 IAI alumnus) was hired as the Institute's Assistant Research Scientist and Associate Director. Fred started first thing in August and has been making outstanding contributions to the Institute since then (well, actually he was working with us during the summer also so he really did "hit the ground running" in August). His responsibilities are generally the same as Michael's but with some minor tweaks. For example, the Franklin College of Arts and Sciences technology support services now helps manage a large part of the Institute's computing infrastructure, which frees up some time for Fred to deal with other Institute issues such as MSAI course management and research. We're very glad to have Fred with us. His energy and insights for moving the Institute into the future are fantastic. You'll be reading more about his accomplishments in future newsletters, so stay tuned.



Since the last newsletter, I've heard from more MSAI alumni than I've heard from since we started the newsletter. Kevin Crowell (2008) contacted us from the Pacific Northwest National Laboratory with some interesting possibilities for collaboration. Astrid (Glende) Jackson (2004) took a position with Electronic Arts after she graduated and is now considering moving back into academia. Ramyaa (2004) is now a visiting assistant professor of computer science at Wesleyan University. Jonathan McClain (also 2004) is still with Sandia National Laboratory and let us know about an available position in his cognitive sciences group. Greg Izzo (1993) with Left Brain Games contacted us about the release of his company's latest DARPA sponsored gaming environment. Coincidentally, Nelson Rushton (2001) is involved with the same DARPA project from his lab at Texas Tech. OK, I also heard from Harold 'Buz' Dale (2000) from across campus, totally out of the blue, regarding our Web site but I don't really count that since he's still with EITS; we just never hear from him, whereas Hajime Uchiyama (2008) and David Crouch (2002), also with EITS, can be seen on the first floor of Boyd fairly frequently. Nevertheless, it's fantastic to hear from everyone and find out how everyone is doing. If you haven't "touched base" with us in a long time, please do. We are always keen to hear about your latest activities. Keep in touch!

Recent Graduates

The AI Institute would like to extend congratulations to all recent graduates of the AB and MS programs.

AB in Cognitive Science: Hannah Harrison, Theodore B Hunter, Jeff Kubler, Rachel Alexandria Lee, Nathanael Adam Mullennix, Dylan Sean McClelland, Ryan Burke Sas, and Fred Wu.

MS in Artificial Intelligence: Matthew Losanno (Thesis: *Measurement of Spatial Colocalization of Objects in N-Channel Confocal Images*); William Richardson (Thesis: *Evolutionary Instance Resampling for Difficult Data Sets*); Shu Zhang (Thesis: *Evolutionary Accompaniment Systems for Creative Music Generation*)

Additional Student News

Recent AI graduate **Shu Zhang** was accepted to and is currently a Dramatic Media graduate student in UGA's School of Theater and Film Studies. • Cognitive science graduate **Nathanael Mullennix** has accepted a position at Yaskawa Electric and will be moving to Kitakyushu on the island of Kyushu. Yaskawa, which formed in 1915, manufactures industrial robots, electric motors, and other products for automation. • This summer, AI student **Peter Geiger** travelled to the Gulf Coast with a team from UGA's Center for Applied Isotope Studies to deploy the CAIS's field survey lander. The lander, equipped with modules for microbiological and geochemical sampling and analysis, was deployed to a depth of about 1km along the Sigsbee deep. Peter saw sharks. Earlier in the year, He presented a paper at the GEM conference in Las Vegas.

Selected Publications and Presentations

1. Venkadesh, S., Hoogenboom, G., McClendon, R. W., and Potter, W. D., "A Genetic Algorithm to Refine Input Data Selection for Air Temperature Prediction Using Artificial Neural Networks," in *Applied Soft Computing*, pp. 2253-2260, Vol. 13, 2013.
2. Nadig, K., G. Hoogenboom, W.D. Potter, and R. W. McClendon "Comparison of Individual and Combined ANN Models for Prediction of Air and Dew Point Temperature," in *Applied Intelligence: The International Journal of Artificial Intelligence, Neural Networks, and Complex Problem Solving Technologies*, pp. 354-366, Vol. 39, No. 2, Sept., 2013.
3. W. Ling, and W.D. Potter, "Virus Transmission Genetic Algorithm," in *Proceedings of the 26th International Conference on Industrial, Engineering & Other Applications of Applied Intelligent Systems*, The Netherlands, June, 2013; and in *Contemporary Challenges & Solutions in Applied AI*, Studies in Computational Intelligence, Vol. 489, pp. 41-46, Springer International Publishing, Switzerland, 2013.
4. X. Qi, K. Rasheed, K. Li, and W. Potter, "A Fast Parameter Setting Strategy for Particle Swarm Optimization and Its Application in Urban Water Distribution Network Optimal Design," in *Proceedings of the 2013 International Conference on Genetic and Evolutionary Methods (GEM'13)*, pp. 53-62, Las Vegas, NV, July, 2013.
5. P. Geiger, W. Potter, and W. Richardson, "Evolutionary Path Algorithm: A Simple and Extensible Meta-heuristic for Global Optimization," in *Proceedings of the 2013 International Conference on Genetic and Evolutionary Methods (GEM'13)*, pp. 83-90, Las Vegas, NV, July, 2013.

How to Sponsor Research

As an industrial partner or associate of the IAI, you can be involved in our research in four ways:

Collaboration, especially student projects. It doesn't necessarily cost anything to work with us. We are always looking for good research topics, especially for master's theses.

Sponsored research. You can contract with us through the University of Georgia Research Foundation (UGARF) to do research for your company. *We are always looking for research sponsors.*

Donations. If you don't need confidentiality or a specific deliverable, you can simply make a gift to the IAI designated to support a particular research program. Donations are made through the Arch Foundation and are fully tax-deductible.

Consulting. You can hire faculty members or graduate students to work for you part-time as independent contractors. The University encourages this. It's a good way to do a small project with a high level of confidentiality.

