Co-Director’s Note: DIANE LITMAN

Dear ISP Family,

Welcome to the inaugural (and hopefully yearly) newsletter of the Intelligent Systems Program at the University of Pittsburgh! In this first issue, we hope to bring you up to speed regarding the ISP's current people, research, activities, and accomplishments.

The goals of the ISP are to provide an outstanding interdisciplinary graduate education and to be the center of expertise in intelligent systems within the university. In 2002, ISP moved locations and is now housed on the 5th floor of the Sennott Square Building (at the corner of Forbes and South Bouquet, next to the law school). Since 2010, Professor Janyce Wiebe and I have been serving as Co-Directors of the program. I myself joined Pitt in 2001, and have a joint appointment with Computer Science and the Learning Research and Development Center.

During 2013-2014, the ISP had 22 voting faculty, representing departments within arts and sciences, the medical school, law school, school of information science, and school of engineering. The Intelligent Systems Program has traditionally emphasized research in the areas of Natural Language Processing and Information Retrieval, Intelligent Tutoring Systems and Educational Technology, Machine Learning and Decision Making, and Biomedical Informatics. New faculty that have joined the ISP in recent years have enabled us to move towards developing a fifth area of excellence relating to social media. The research of Professors Kevin Ashley, Gregory Cooper (two of our most longstanding faculty members) and Rosta Farzan (a program graduate and a much more recent faculty member) are highlighted in the articles that follow.

During 2014-2015, the ISP expects to have 23 new and returning graduate students. Our applicant pool continues to be strong, enabling us to usually admit students with prior research experience. Even though ISP is a small program, ISP students have been very successful in the Dietrich School’s Andrew Mellon Fellowship program, and have been honored with a multitude of best paper awards. Once our students do graduate, ISP has been very successful in placing them in good positions spanning academia, industry and research labs.

As you read this issue, we hope that one theme stands out: we want to stay in touch with you! Whether you live in the Pittsburgh area or are just visiting, please come and visit us (and perhaps give a talk at our ISP AI Forum, a series of Friday talks by Pitt faculty, students and visitors). Please read our webpages, keep in touch via Facebook and Twitter, and update the Google spreadsheet. Finally, I welcome any feedback on this newsletter, and hope to receive contributions for future editions.

This year, we have created the first Intelligent Systems Program newsletter. If you have news for ISP or wish to have a copy of the newsletter mailed to you, please email Michele Thomas at paum4b@pitt.edu. You can find ISP Newsletter on the web at http://www.isp.pitt.edu/newsletter/

Co-Director: Diane Litman
Editor: Shaghayegh (Sherry) Sahebi
Publication Staff: Michele Thomas
Professor Kevin Ashley and his Graduate Student Researchers (GSR) work in the areas of Artificial Intelligence applications in law and education. They develop computational models of normative reasoning and argumentation in law and practical ethics to better understand decision-making and as a basis for systems to teach students argumentation skills. They link computational models of legal reasoning with legal texts to extract information related to argumentation with cases and from statutes and to apply that information to assist legal practitioners.

Supported by an NSF grant entitled “Teaching Writing and Argumentation with AI-Supported Diagramming and Peer Review,” Ashley, his co-PIs Diane Litman and Chris Schunn, and his GSRs have been working to improve students’ written argumentation by enabling students to plan written arguments using computer-supported diagramming, and by supporting students in peer-reviewing each other’s diagrams and written arguments using instructor-provided criteria. For instance, Collin Lynch’s ISP dissertation demonstrated that machine learning discovered diagram features that predicted the quality of students’ later-produced papers. Soon the researchers will conduct an experiment at Kenya’s Moi University Law School to assess the effectiveness of argument diagramming as compared to traditional methods. ISP GSR Mohammad Falakmasir has developed and is assessing a machine learning program to detect high school students’ thesis statements in argumentative essays. It will guide peer reviewers in finding and critiquing an author’s thesis statement. This work is supported by an Institute of Education Sciences grant entitled “Intelligent Scaffolding of Peer Review of Writing” with co-PIs Diane Litman, Christian Schunn and Amanda Godley. ISP GSR Fataneh Jabari has begun to assist Mohammad in extending the approach to detect additional argument structure in students’ essays.

ISP GSR Matthias Grabmair is completing his dissertation entitled “Modeling Purposive Legal Argumentation with Argument Schemes using the Value Judgment Formalism.” He is implementing his formal model of values-based legal argument in a program that generates legal arguments as well as predictions of the outcomes of inputted cases. His program’s predictions will be assessed against the actual outcomes of cases in a corpus of over two hundred trade secrets cases, and legal professionals will evaluate the appropriateness of its arguments. His computer program goes beyond a straightforward application of a legal rule by arguing whether the rule’s outcome given the inputted facts would produce a decision that is coherent with the value-tradeoffs established through prior cases. Matthias is also working with Professors Ashley and Vern Walker of Hofstra University on a project aimed at extracting arguments from cases for use in improving legal information retrieval. They focus on modeling evidentiary arguments in a corpus of federal court decisions of special masters. In addition, Matthias and ISP GSR Jaromir Savelka have been using machine learning to annotate state statutes dealing with public health emergencies. Network diagrams based on the annotated statutes facilitate comparing different states’ statutory systems. Ultimately, both projects will employ an open source Unstructured Information Management Architecture annotation pipeline for extracting key components of legal arguments.
Professor Gregory Cooper: Biomedical Informatics

Dr. Cooper’s research involves the application of decision theory, probability theory, machine learning, Bayesian statistics, and artificial intelligence to biomedical informatics research problems. He is currently involved in the following research projects in collaboration with faculty and student investigators in the ISP, the Department of Biomedical Informatics, and other groups. For brevity, just the ISP faculty and students are listed for each project.

Detecting Deviations in Clinical Care: The goals of this project are to develop, implement, and evaluate computer-based methods that model usual clinical care and then apply those models to detect individual patient care that is anomalous. In the future, such a system may serve as a “safety net” that continuously monitors patient care, as documented in an electronic medical record, and raises an alert when such care appears to be anomalous. The main hypothesis of the project is that such anomalies will correspond to medical errors often enough to make such alerting worthwhile. Within the intensive care unit (ICU) domain the project is currently investigating the extent to which this hypothesis is supported. The ISP members involved in the project are Dr. Hauskrecht, Dr. Visweswaran, Mr. Saeed Amizadeh and Mr. Mahdi Pakdaman.

Bayesian Rule Learning Methods for Disease Prediction and Biomarker Discovery: This project is developing and evaluating Bayesian rule learning methods that use high-throughput molecular data (e.g., proteomic and genomic data) to perform disease prediction and biomarker discovery. Datasets being analyzed include those in the domains of lung cancer, breast cancer, amyotrophic lateral sclerosis, and other diseases. The ISP members involved are Dr. Gopalakrishnan, Dr. Visweswaran and Mr. Jeya Balasubramanian.

Probabilistic Disease Surveillance: This project is developing and evaluating a probabilistic approach to disease surveillance. The goal of the research is to improve the ability of public health officials to estimate the current incidence of influenza and other infectious diseases and to predict the future course of epidemics of those diseases. This information is expected to better support decisions made by health departments to control epidemics, which is expected to reduce morbidity and mortality from epidemic diseases. The ISP members involved are Dr. Wagner, Dr. Tsui, and Ms. Ye Ye.

Identifying Multivariate Statistical Differences Between Groups: This project is investigating a novel approach to the problem of detecting multivariate statistical differences across groups of data, which arises in a wide variety of settings. Such circumstances occur naturally in observational studies, where, for example, a clinical researcher may observe a difference in the prevalence of a condition between two groups of patients and would like to explore the reasons behind the difference. Another example is comparative effectiveness research, where it is of interest to understand an observed difference between two clinical treatment approaches. The ISP faculty involved are Dr. Hauskrecht and Dr. Visweswaran. Yuriy Sverchkov recently completed his doctoral dissertation entitled “Detection and Explanation of Statistical Differences Across a Pair of Groups.” He is now a postdoctoral fellow at the University of Wisconsin in Madison in the Department of Biostatistics and Medical Informatics.
Research Spotlight

Interview with Professor Farzan

Dr. Rosta Farzan is an Assistant Professor in the School of Information Sciences at the University of Pittsburgh. She graduated from ISP in 2009 and her thesis topic was “A study of Social Navigation Support under Different Situational and Personal Factors.” After graduating from ISP, she worked as a post-doc at the Social Computing Lab of Human-Computer Institute of Carnegie Mellon University. She started her job at the University of Pittsburgh in August 2012 and joined ISP as a faculty member. Here is an interview we had with her in the past weeks:

- What did you do after graduating from ISP?

-- After I graduated from the ISP, I started a postdoc in the Human-Computer Interaction program at CMU. I was a postdoc there for 3 years and then back to Pitt as a faculty.

- How did ISP help you prepare for your positions? E.g. how did ISP prepare you for your postdoc?

-- I think an important feature of the ISP is the interdisciplinary nature of the program, which allowed me to be exposed to many different fields during my PhD. Because of that, I got introduced to researchers in different fields, specifically Dr. Robert Kraut who later was my postdoc supervisor. I read his research during my PhD and I was very eager to have the chance to work with him to strengthen the experimental design aspect of my research. At the same time, having diverse skills was useful in succeeding in job search, and even looking for the internship which was actually very helpful later for me to succeed in my postdoc and faculty job search. Also, I think ISP provides a lot of flexibility, which is important for PhD students. The flexibility allowed me to plan my time effectively towards my career goals. At ISP, I always felt everyone could go through a personalized PhD path, which I think is important for the creative and intellectual process, which needs to happen during the PhD.

- What do you miss about ISP? What did you like the most about it?

-- ISP is a great friendly program with lots of smart people around. I feel ISP has been very successful in attracting many smart faculty, students, postdocs, and so on. Being around them, attending talks, having random conversations during the ISP seminars was always refreshing and inspiring. Oh, I know this might sound strange, but I do miss ISP lunches :D After 5 years of having that lunch twice a month, it has become something nostalgic :D

- How does it feel to come back to ISP as a faculty?

-- It feels great! I like ISP a lot and I feel very good to be able to hopefully contribute to the program as a faculty. Every time I am back to the building to attend a meeting or a talk, it feels great! I was actually encouraged by ISP faculty to join ISP after I started my appointment at the School of Information Sciences and I am very happy about that.
Research Spotlight

Interview with Professor Farzan

- You've brought a new field of research to ISP. What is your field of research and how does it extend ISP?

-- My field of research is human computer interaction, particularly focusing on online communities. I think my research introduces a new domain of practice to the ISP. The new context of social media, online communities, and human computer interaction introduces different challenges for machine learning and intelligent algorithms. My research capitalizes on the idea of the most smart entity is most likely a combination of human intelligence and computer intelligence as suggested by concepts such as wisdom of the crowd.

- As someone who experienced ISP as both a faculty and a student, what would you like others to know about ISP?

-- Every time I talk to others about ISP, I make sure to highlight how friendly the program is. I think that is a key for success both as a student and as a PhD to be in a friendly environment, which at the same time challenges you. And as I said before, I believe the interdisciplinary nature of ISP and the flexibility of the PhD program is indispensable.

ISP on Social Media

We have organized Google, Twitter, and Facebook accounts for ISP. Although they are not very active right now, we encourage everyone to follow ISP and be in contact with us through these pages. We are using a Google spreadsheet to collect updates and contact information from all ISP student and faculty alumni. We would appreciate it if you could update us through that page. You can access ISP on:

Facebook: https://www.facebook.com/pages/Intelligent-Systems-Program-atUPitt/518952964900908

Twitter: https://twitter.com/ISPPitt (@ISPPitt)

Google: isp.pitt@gmail.com

ISP Welcome Picnic

As in prior years, ISP is holding a picnic to welcome new students and faculty and greet the current faculty, alumni, and students. The picnic is going to be held on Friday September 12th at Bartlett Shelter in Schenley Park. We would like to include all the local ISP alumni and we hope to see all of you and families there. We’ll have lots of food and beverages – you bring the Frisbees!

Here are the details of this event:
Where: Schenley Park
Bartlett Shelter
Intersection of Bartlett Street and Panther Hollow Road
When: Friday, September 12th
3:30pm – 6:30pm (or later)

Please let us know if you will be able to join us by emailing to Michele: paum4b@pitt.edu

Farewell Wendy, Hello Michele!

At the end of past spring, our beloved program administrator, Wendy Bergstein, decided to retire. ISP faculty and students congratulated her for her well-deserved retirement in a farewell party. She will be greatly missed and her retirement is a loss to ISP as she did great on her job and beyond that. She was as a family member of ours during the best and worst of the times and we could not have done so well without her. We wish her a very happy time ahead.

Our new administrator, Michele L. Thomas started her job in summer 2014. She has been at Pitt since December of 1994. Her first full time position was in the Cashier’s Office, now known as the Student Payment Center and she has been in multiple departments since that time. Most recently, she spent a little over 7 years in Electrical and Computer Engineering as an undergraduate administrator and general assistant. When she is not at Pitt, she and her husband are active in the historical re-enacting world. They started out in the middle ages and have now "time traveled" to the period of the US Civil War. They live about an hour outside of Pittsburgh with their small herd of cats. We are confident she will be a welcome addition to our program.
ISP Distinguished Lectures

In the past four years, ISP has resumed its distinguished lecture series. Each year, ISP hosts a distinguished researcher on one of the ISP Friday seminars. Students and faculty meet with the speaker and have a chance to arrange individual and group meetings with him/her. Here is a list of our distinguished speakers and the title of their talks:

**Henry Kautz** (Professor and Chair, Department of Computer Science and Institute for Data Science, University of Rochester), *Twitterhealth: Mining Public Health Information from Social Media*, April 18, 2014

**Shrikanth (Shri) Narayanan** (Professor of Computer Science, Linguistics & Psychology, and Electrical Engineering, University of Southern California), *Behavioral Signal Processing: Possibilities and Opportunities for Informatics*, April 12, 2013

**Marilyn Walker** (Professor, Department of Computer Science, University of California Santa Cruz), *Expressive Generation for Interactive Stories*, April 13, 2012

**Eric Horvitz** (Distinguished Scientist, Microsoft Research), *Pathways to Deeper Human-Computer* ...

ISP Alumni Speakers

In addition to the distinguished speakers, ISP is glad to host ISP alumni as external speakers. Noboru Matsuda, Ilya Goldin, and Cristina Conati were ISP graduates who gave a talk in ISP seminars. We welcome any ISP alumni who decide to give a talk on his/her research in our seminars. Please let us know if you would like to give a talk or if you will be in Pittsburgh and have time to visit our faculty and students by emailing Michele at: paum4b@pitt.edu. Here is a list of ISP alumni lecture titles:

**Noboru Matsuda** (Systems Scientist, Human-Computer Interaction Institute, Carnegie Mellon University), *Simulated Student as a Methodology to Advance Theories of Learning*, February 7, 2014

**Cristina Conati** (Associate Professor, University of British Columbia), *Who are my users and how I can help them? The quest of user-adaptive interaction, applied to Information Visualization*, May 17, 2013

**Ilya Goldin** (Postdoctoral Fellow, Carnegie Mellon University, Human-Computer Interaction Institute), *Towards Effective Feedback for All: Learner Differences in Hint Processing*, November 2, 2012

**Noboru Matsuda** (Systems Scientist, Human-Computer Interaction Institute, Carnegie Mellon University), *SimStudent: An Intelligent Pedagogical Agent That Helps Student Learn By Teaching*, March 4, 2011
ISP faculty, alumni, and students attend many research conferences each year and publish in various venues. Intelligent Tutoring Systems, Educational Data Mining, Association for Computational Linguistics (ACL), User Modeling, International Conference on Robotics and Automation, SPIE Image Processing, Recommender Systems, Conference on Human Factors in Computing Systems, and Knowledge Discovery and Data Mining are among the conferences that ISP faculty and students publish in and attend. This year many ISP faculty, alumni, and students (two faculty members, five current students, and eight ISP alumni) attended and presented their work at the Intelligent Tutoring Systems (ITS) conference. Below, there is a picture of ISP affiliates at ITS in Honolulu. Also, three ISP faculty and four ISP students attended ACL this year. Above, there is a picture of student attendees from ISP at the Baltimore Inner Harbor. A list of recent ISP publications can be found at http://www.isp.pitt.edu/resources/publications
ISP is glad to welcome the two new faculty members who joined us last academic year. Yu-Ru Lin is an Assistant Professor in the School of Information Sciences. Her research interests are in studying social and political networks, as well as computational and visualization methods for understanding network data. Ervin Sejdić is another ISP faculty. He is an Assistant Professor in the Department of Electrical and Computer Engineering. His work is on dynamical biomarkers indicative of age- and disease-related changes and their contributions to functional decline under normal and pathological conditions.

Here are some highlights from ISP student and faculty achievements and awards during the past academic year:

**Best Paper Awards and Nominations:**

- Mohammad Falakmasir won the EDM 2013 Best Student Paper award for the paper "A Spectral Learning Approach to Knowledge Tracing".
- Phillip Walker won the Best Paper award for the paper "Different Levels of Automation for Human Influence of Robot Swarms" in 2013 International Annual Meeting of the Human Factors and Ergonomics Society.
- Yun Huang’s paper (on FAST student modeling for Java programming domain) was nominated for the Best Paper award at EDM’14.
Andrew Mellon Predoctoral Fellowships

- Lingjia Deng received the Andrew Mellon Predoctoral Fellowships for the academic year 2014-2015.
- Mohammad Falakmasir received the Andrew Mellon Predoctoral Fellowships for the academic year 2014-2015.
- Phillip Walker received the Andrew Mellon Fellowship for the 2013-2014 academic year.
- Yuriy Sverchkov received the Andrew Mellon Fellowship for the 2013-2014 academic year.

International Fellowships and Grants

- Professor Diane Litman received the Royal Academy of Engineering Distinguished Visiting Fellowship Award in May 2014, supporting a visit to the University of Cambridge to collaborate with Professor Steve Young’s spoken dialogue group.
- Professor Peter Brusilovsky was honored with a Core Fulbright U.S. Scholar Grant. He is one of the four University of Pittsburgh faculty members who have been selected for 2013-14 Core Fulbright U.S. Scholar grants. Brusilovsky is focusing his Fulbright research on creating online learning tools for teaching computer and information sciences. He is working with research teams at three Finnish institutions—Aalto University, Helsinki University, and the Helsinki Institute for Information Technology.
New ISP Graduates

During the last academic year, four ISP students received their Ph.D. degrees and graduated successfully. Eric Williams graduated in 2013. His main research interests are machine learning, computational scientific discovery, and computational biology.

Collin Lynch graduated in 2014. His research includes graph learning and rule induction for rich graph structures and automated analysis of student produced argument diagrams and written scientific arguments. He is currently a postdoc at North Carolina State University.

Saeed Amizadeh started his ISP studies in 2007. His main research area is Machine Learning, especially Spectral Data Analysis and Learning Graphical Models. He is currently working as a research scientist at Yahoo labs.

Cem Akkaya started as a graduate student in ISP in 2006. His main research is focused on Natural Language Processing and applications of Word Sense Disambiguation to Subjectivity / Sentiment Analysis. He is an applied Scientist at Yahoo Labs.

Their dissertation abstracts are listed in the following pages.

Subjectivity Word Sense Disambiguation: a Method for Sense-Aware Subjectivity Analysis

Cem Akkaya

Advisor:
Dr. Janyce Wiebe

Committee:
Dr. Diane Litman, Dr. Milos Hauskrecht, Dr. Adam J. Lee

Subjectivity lexicons have been invaluable resources in subjectivity analysis and their creation has been an important topic. Many systems rely on these lexicons. For any subjectivity analysis system, which relies on a subjectivity lexicon, subjectivity sense ambiguity is a serious problem. Such systems will be misled by the presence of subjectivity clues used with objective senses called false hits. We believe that any type of subjectivity analysis system relying on lexicons will benefit from a sense-aware approach. We think sense-aware subjectivity analysis has been neglected mostly because of the concerns related to word sense disambiguation (WSD), the problem of automatically determining which sense of a word is activated by the use of the word in a particular context according to a sense-inventory. Although WSD is the perfect tool for sense-aware classification, trust in traditional fine-grained WSD as an enabling technology is not high due to previous mostly unsuccessful results. In this thesis, we investigate feasible and practical methods to avoid these false hits via sense-aware analysis. We define a new coarse-grained WSD task capturing the right semantic granularity specific to subjectivity analysis.
Non-parametric Graph-based Methods For Large Scale Problems

Saeed Amizadeh

Advisor:
Dr. Milos Hauskrecht

Committee:
Dr. Gregory Cooper, Dr. Marek Druzdzel, Dr. Shyam Visweswaran, Dr. Chakra Chennubholta, Dr. Rebecca Nugent

The notion of similarity between observations plays a very fundamental role in many Machine Learning and Data Mining algorithms. In many of these methods, the fundamental problem of prediction, which is making assessments and/or inferences about the future observations from the past ones, boils down to how "similar" the future cases are to the already observed ones. However, similarity is not always obtained through the traditional distance metrics. Data-driven similarity metrics, in particular, come into play where the traditional absolute metrics are not sufficient for the task in hand due to special structure of the observed data. A common approach for computing data-driven similarity is to somehow aggregate the local absolute similarities (which are not data-driven and can be computed in a closed-from) to infer a global data-driven similarity value between any pair of observations. The graph-based methods offer a natural framework to do so. Incorporating these methods, many of the Machine Learning algorithms, that are designed to work with absolute distances, can be applied on those problems with data-driven distances. This makes graph-based methods very effective tools for many real-world problems.

In this thesis, the major problem that I want to address is the scalability of the graph-based methods. With the rise of large-scale, high-dimensional datasets in many real-world applications, many Machine Learning algorithms do not scale up well applying to these problems. The graph-based methods are no exception either. Both the large number of observations and the high dimensionality hurt graph-based methods, computationally and statistically. While the large number of observations imposes more of a computational problem, the high dimensionality problem has more of a statistical nature. In this thesis, I address both of these issues in depth and review the common solutions for them proposed in the literature. Moreover, for each of these problems, I propose novel solutions with experimental results depicting the merits of the proposed algorithms. Finally, I discuss the contribution of the proposed work from a broader viewpoint and draw some future directions of the current work.
The Diagnosticity of Argument Diagrams

Collin Lynch

Advisor:
Dr. Kevin Ashley

Committee:
Dr. Vincent Aleven, Dr. Diane Litman, Dr. Chris Schunn

Can argument diagrams be used to diagnose and predict argument performance? Argumentation is a complex domain with robust and often contradictory theories about the structure and scope of valid arguments. Argumentation is central to advanced problem solving in many domains and is a core feature of day-to-day discourse. Argumentation is quite literally, all around us, and yet is rarely taught explicitly. Novices often have difficulty parsing and constructing arguments particularly in written and verbal form. Such formats obscure key argumentative moves and often mask the strengths and weaknesses of the argument structure with complicated phrasing or simple sophistry. Argument diagrams have a long history in the philosophy of argument and have been seen increased application as instructional tools. Argument diagrams reify important argument structures, avoid the serial limitations of text, and are amenable to automatic processing. This thesis addresses the question posed above. In it I show that diagrammatic models of argument can be used to predict students’ essay grades and that automatically-induced models can be competitive with human grades. In the course of this analysis I survey analytical tools such as Augmented Graph Grammars that can be applied to formalize argument analysis, and detail a novel Augmented Graph Grammar formalism and implementation used in the study. I also introduce novel machine learning algorithms for regression and tolerance reduction. This work makes contributions to research on Education, Intelligent Tutoring Systems, Machine Learning, Educational Datamining, Graph Analysis, and online grading.
Automated Detection of Anomalous Patterns in Validation Scores for Protein X-Ray Structure Models
Eric Williams
Advisor:
Dr. John Rosenberg
Committee:
Dr. Gregory Cooper, Dr. Shyam Visweswaran, Dr. Xinghua Lu

Structural bioinformatics is a subdomain of data mining focused on identifying structural patterns relevant to functional attributes in repositories of biological macromolecular structure models. This research focused on structures determined via x-ray crystallography and deposited in the Protein Data Bank (PDB). Protein structures deposited in the PDB are products of experimental processes, and only approximately model physical reality. Structural biologists address accuracy and precision concerns via community-enforced consensus standards of accepted practice for proper building, refinement, and validation of models. Validation scores are quantitative partial indicators of the likelihood that a model contains serious systematic errors. The PDB recently convened a panel of experts, which placed renewed emphasis on troubling anomalies among deposited structure models. This study set out to detect such anomalies. I hypothesized that community consensus standards would be evident in patterns of validation scores, and deviations from those standards would appear as unusual combinations of validation scores. Validation attributes were extracted from PDB entry headers and multiple software tools (e.g., WhatCheck, SFCheck, and MolProbity). Independent component analysis (ICA) was used for attribute transformation to increase contrast between inliers and outliers. Unusual patterns were sought in regions of locally low density in the space of validation score profiles, using a novel standardization of Local Outlier Factor (LOF) scores. Validation score profiles associated with the most extreme outlier scores were demonstrably anomalous according to domain theory. Among these were documented fabrications, possible annotation errors, and complications in the underlying experimental data. Analysis of deep inliers revealed promising support for the hypothesized link between consensus standard practices and common validation score values. Unfortunately, with numerical anomaly detection methods that operate simultaneously on numerous continuous-valued attributes, it is often quite difficult to know why a case gets a particular outlier score. Therefore, I hypothesized that IF-THEN rules could be used to post-process outlier scores to make them comprehensible and explainable. Inductive rule extraction was performed using RIPPER. Results were mixed, but they represent a promising proof of concept. The methods explored are general and applicable beyond this problem. Indeed, they could be used to detect structural anomalies using physical attributes.
Hua Ai (2009)

Hua is currently a data scientist at 360i in Atlanta, Georgia, mining large data (and text!), and sets to shape up digital marketing strategies.

Min Chi (2009) and Collin Lynch (2013)

Having two lovely children, Min is currently an Assistant Professor and Collin is a post-doc of Computer Science at North Carolina State University.

Chas Murray (2005)

Chas is working as a cognitive scientist at Carnegie Learning, which is now part of Apollo Education Group, right here in Pittsburgh. They are designing and developing lots of math tutors and some grammar tutors, with tutors for other subjects on the horizon. Living in Edgewood with his wife Raeann and daughter Allison, who is now 15.

R. Michael Young (1998)

In 2013, Michael and his wife Lisa celebrated the birth of their second son, Henry Browning Young. In 2014, Michael was designated an ACM Distinguished Scientist. In 2015, Michael hopes to get more sleep. This is a picture of his cute second son:

Patricia Albacete (1999)

Her oldest daughter, Victoria, will be a freshman at Oberlin College this fall (yes, time flies!). During this time she has enjoyed watching her kids grow up –while chauffeuring them around– and has kept her toes in the water working behind the scenes on a couple of projects. For the past four years she has been participating more actively in some interesting dialogue-based ITS projects at LRDC.

Violetta Cavalli Sforza (1998)

She has just completed her sixth year at Al Akhawayn University, an American-style institution, in the Atlas Mountains of Morocco. Her research still focuses on education and language, both Arabic and, more recently, Amazigh (Berber), and she teach a fair amount. She and her husband have many animals and would like more and different.
Cristina Conati (1999) and Giuseppe Carenini (1995)

Cristina Conati and Giuseppe Carenini (both ISP alumni) just received the best paper award at UMAP 2014, for a paper they have co-authored with their students on using eye tracking for adaptive information visualization, a new field they have pioneered in recent years.

Rosta Farzan (2009)

Rosta has shared the news about buying her first house ever this year! She says it has been a great experience so far and she enjoys her house very much. Rosta says: “As an immigrant, buying a house in the US was definitely a big step for me and made Pittsburgh even more of a home for me”. She sent us a picture of the moment she got the keys to her first house!


Noboru is a Systems Scientist at the Human-Computer Interaction Institute and a leading researcher at an NSF & IES funded SimStudent project (www.SimStudent.org). SimStudent is a computational model of cognitive skill learning, and he uses the SimStudent technology to simulate student learning. He also uses SimStudent as a teachable agent that allows students learn by teaching SimStudent. SimStudent also works as an intelligent authoring tool to build a cognitive tutor by teaching the computer (i.e., SimStudent!). They have recently received a three-year grant from NSF to extend their study on learning by teaching (http://1.usa.gov/1pGICgh). He has also recently started a new collaboration with the Open Learning Initiative at CMU for a project on evidence-based courseware improvement with a two-year NSF grant (http://1.usa.gov/1lImv55).
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<td><strong>Ilya Goldin (2011)</strong></td>
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<td>Ilya has recently finished his first year as a Research Scientist at Pearson. Based from his home in Pittsburgh, he works on a variety of Educational technologies, and publishes research in scholarly venues. He is also an Edmund W. Gordon MacArthur Foundation / Educational Testing Service Fellow, working on issues of assessment for learning.</td>
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<td><strong>Yanna Kang (2009)</strong></td>
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<td>Yanna is now a scientific reviewer working at the FDA to perform premarket reviews on medical imaging devices.</td>
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