Kelly Rivers

Assistant Teaching Professor, Computer Science Department
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Education

Ph.D.	**Human Computer Interaction**	Carnegie Mellon University	2017
M.S.	**Human Computer Interaction**	Carnegie Mellon University	2015
B.S.	**Mathematics and Computer Science**	Carnegie Mellon University	2011

Teaching Experience

• Instructor for Fundamentals of Programming and Computer Science	Spring 2013
	Fall 2017
	Spring 2018
• Instructor for Principles of Computing	Fall 2016
• Teaching Assistant for User-Centered Research & Evaluation	Fall 2014
• Instructor for User Interface Lab (Section B - GUI)	Fall 2013

Research Interests

Keywords: computer science education research, data-driven tutoring, hint generation, automatic feedback, solution spaces, intelligent tutoring systems, educational data mining, human computer interaction

Summary: I work on the development of data-driven tutoring techniques, mostly in the domain of programming. This work is aimed at providing students and instructors with in-depth information about the solution space of a given domain, where a student is within it, and what might be done to instigate and assist learning. I also study the effects that these tutoring techniques have on student learning.

Journal Papers

1. Rivers, K. & Koedinger, K.R. (2015). Data-Driven Hint Generation in Vast Solution Spaces: A Self-Improving Python Programming Tutor. *International Journal of Artificial Intelligence in Education*, 1-28.

Conference Publications

1. Rivers, K., Harpstead, E., and Koedinger, K. (2016) Learning Curve Analysis for Programming: Which Concepts do Students Struggle With? In *Proceedings of the 2016 ACM Conference on International Computing Education Research*. pp 143-151.
2. Ihantola, P., Vihavainen, A., Ahadi, A., Butler, M., Börstler, J., Edwards, S., Isohanni, E., Korhonen, A., Petersen, A., Rivers, K., Rubio, M., Sheard, J., Skupas, B., Spacco, J., Szabo, C., Toll, D. (2015). Educational Data Mining and Learning Analytics in Programming: Literature Review and Case Studies. In *Proceedings of the 2015 ITiCSE on Working Group Reports*. pp. 41-63.
3. Rivers, K. & Koedinger, K.R. (2014). Automating Hint Generation with Solution Space Path Construction. In *Proceedings of the 12th International Conference on Intelligent Tutoring Systems*. pp. 329-339.
4. Rivers, K. & Koedinger, K.R. (2013). Automatic Generation of Programming Feedback: A Data-Driven Approach. In *Proceedings of the Workshops at the 16th International Conference on Artificial Intelligence in Education AIED 2013*. pp. 50-59.
5. Spacco, J., Fossati, D., Stamper, J. & Rivers, K. (2013). Towards improving programming habits to create better computer science course outcomes. In *Proceedings of the 18th ACM conference on Innovation and technology in computer science education*. pp. 243-248.
6. Sudol, L.A., Rivers, K. & Harris, T. (2012). Probabilistic Distance to Solution in a Complex Problem Solving Domain. In *Proceedings of the 5th International Conference on Educational Data Mining.* pp. 144-147.

Other Publications

1. Price, T. W., Brown, N. C., Piech, C., & Rivers, K. (2017). Sharing and Using Programming Log Data. In *Proceedings of the 2017 ACM SIGCSE Technical Symposium on Computer Science Education.* pp. 729-729.
2. Rivers, K. (2015). Designing a Data-Driven Tutor Authoring Tool for CS Educators. In *Proceedings of the eleventh annual International Conference on International Computing Education Research*. pp. 277-278.
3. Rivers, K. and Koedinger, K. (2014). Open-Ended Tutoring for Programming: Building Next-Step Hints into an Online Development Environment. At *the Second Workshop on AI-supported Education for Computer Science (AIEDCS)*.
4. Rivers, K. (2014). Automating Hint Generation with Solution Space Path Construction. At the *Seventh Annual inter-Science of Learning Center Student and Post-doc Conference*.

5. Hovemeyer, D., Hertz, M., Denny, P., Spacco, J., Papancea, A., Stamper, J., & Rivers, K. (2013). CloudCoder: building a community for creating, assigning, evaluating and sharing programming exercises. In *Proceeding of the 44th ACM technical symposium on Computer science education*. pp. 742.
7. Rivers, K. & Koedinger, K.R. (2012). A Canonicalizing Model for Building Programming Tutors. In *Proceedings of the 11th International Conference on Intelligent Tutoring Systems*. pp. 591-593.

Other Research and Industry Experience

- Google Software Engineering Intern — Summer 2014
- Autolab Frontend Developer — 2010-2012
- Pittsburgh Science of Learning Center Intern — Summer 2010
- Undergraduate Research Assistant — Fall 2009

Honors and Awards

- Program for Interdisciplinary Education Research — 2011-2016
- Science and Humanities Scholar — 2007-2011
- Carnegie Mellon Senior Leadership Recognition — 2011

Service

Committees

- HCI PhD Admissions Committee — 2015
- Head of Carnegie Mellon SCS Teaching Awards Committee — 2014
- Carnegie Mellon CSD TA Committee — 2013-2016

Reviewer (Conferences)

- SIGCSE — 2013-2017
- CHI — 2017
- EDM — 2015, 2017
- AIED — 2013

Reviewer (Fellowships)

- NCWIT — 2011-2015

Student Volunteer (Conferences)

- SIGCSE — 2012, 2015-2016

Skills

Languages

Python, Java, Actionscript, Android, Assembly, Bash Scripting, R, C, Jess, LaTeX, Prolog, Ruby, Standard ML

Web Design

HTML, Javascript, Java Servlets, MySQL, PHP, Ruby on Rails, Flex

Software

Cognitive Tutor Authoring Tools (CTAT), Eclipse, Dreamweaver, InDesign

References

Name	Relationship	Contact
Ken Koedinger	PhD Advisor	koedinger@cmu.edu
David Kosbie	Teaching Mentor	koz@cmu.edu
Margaret Reid-Miller	Co-Instructor	mrmiller@cs.cmu.edu
Tiffany Barnes	Committee Member	tmbarnes@ncsu.edu