KEVIN H. WILSON

EDUCATION

Princeton University, Princeton, NJ
Ph.D., Mathematics, January 2013
Focus on Number Theory and Arithmetic Statistics with Manjul Bhargava

University of Michigan, Ann Arbor, MI
B.S., Mathematics, April 2008, GPA 3.98/4.00
Awarded with Highest Honors and Highest Distinction in Mathematics

PROFESSIONAL EXPERIENCE

University of Chicago, Chicago, IL
Technical Mentor, Data Science for Social Good **Summer 2016**

- With two other mentors, oversaw four teams of 3 – 4 fellows (mostly graduate students or young professionals).
- Fellow teams worked on one of four problems, two of which were early warning systems (EWS) for K-12 schools in rural Ohio and Tulsa, one was an EWS for interacting with the criminal justice system based on education data in Milwaukee, and one was predicting pipe breaks in Syracuse.
- Guided design of solutions to fellows' problems, both from a modeling and a programming perspective.
- Interfaced with partners to procure data necessary to complete projects and buy in necessary to implement the outcomes.
- Taught several mini-courses on Python and the history of American education.

Knewton Inc., New York, NY
Principal Data Scientist **May 2014 – May 2016**

- Led several research projects, theoretical and practical, against Knewton's data sets of many millions of student interactions.
- Example projects include evaluating neural nets for proficiency estimation, building automatic content classifiers based on various NLP techniques, finding natural experiments to test the efficacy of our interventions, and experiments to find the sweet spot on the spectrum of a pure business-logic based system and a pure model-driven system.
- Consulted on system and security architecture, especially as related to data science needs, student privacy, and international expansion concerns.
- Compiled open sourcing standards for the company and shepherd projects into the wild.
- Built and maintained many production models (especially proficiency-derived models) and internal tools (especially Python development-related), which require performant, reliable coding in Java, Python, and assorted other languages.
- Among other things, built a package manager for Python that was backed by AWS S3 that provided HTTPS service for both internal and external packages, as well as command line and web utilities for their maintenance.
- Wrote our main software engineer coding interview (with three others), wrote our career paths for individual contributors in data science and

software engineering (with two others), and oversaw rewrites to several other interview criteria.

Data Scientist **August 2012 – May 2014**

- Developed generalized proficiency and other models for the Knewton platform as well as analyzed their ongoing performance against real student data.
- Implemented these models and a good deal of the accompanying infrastructure for a platform with millions of users.
- Led many cross-team initiatives, including our MapReduce group, our open source working group, and a revamping of our Python standards.
- At various times, was a co-maintainer of our code review, continuous integration, and deployment infrastructures.

TEALS (A Microsoft Subsidiary), Redmond, WA

Remote Teaching Consultant **June 2014 – Present**

- Extended two years of volunteer work teaching high school students computer science remotely in Eastern Kentucky (project won the PEAK Award in Kentucky).
- Have trained around 125 volunteers and 30 classroom teachers on how to run remote classrooms, especially focusing on scaling these trainings to more individuals (25 volunteers in 2015, 100 in 2016).
- Executed classroom visits and interviews for the improvement of the program and formalized the process by which observations are conducted.
- Compiled user research for desirable products necessary to ease remote/computer-based teaching.

Anosov Systems LLC, Brooklyn, NY

Various Consulting Gigs **June 2015 – Present**

- This is the entity under which I contract.
- Gigs have included evaluation of companies for potential VC or grant investment (especially companies focused on statistics-based, educational, or cryptographic products), teacher training in math- and computer science-based topics, and some work on the mathematics of Q-Learning.

Reasoning Mind, Houston, TX

Knowledge Engineering Intern **Summer 2011**

- Developed strategies for translating traditional Russian primary-grades math curricula to computer-based, individualizable curricula.
- Specialized in rapid prototyping of prospective interfaces and user testing using HTML5/JS-based tools, standardized examinations of students' knowledge (especially around math and reading), and user-centered design approaches to the evaluation of prototypes.

National Security Agency, Fort Meade, MD

Director's Summer Program **Summer 2007 and Summer 2008**

- Acquired three patents for techniques developed in computational number theory.
- One of two participants invited to intern with the British Intelligence service.
- Devised and implemented novel machine learning algorithms.

Graphics Design and Custom Programming Contracting
Many companies in the Louisville, KY, area **2000 – 2013**

- Produced local, regional, and national print advertisements.
- Built custom computing solutions, especially inventory management, backup, and accounting services.
- Got start by automating the local newspaper's website updates before the age of WordPress.

TEACHING EXPERIENCE

Lee County High School, Beattyville, KY
Volunteer Remote Instructor

- Developed lessons for a SNAP!-based Computer Science course.
- Taught these lessons remotely two days each week, with other volunteers covering other days.
- Coordinated five volunteers and a classroom teacher to teach these courses.
- Program won a PEAK Award in Kentucky.

Princeton University, Princeton, NJ
Teaching Assistant **Winter 2011**

- Developed supplementary curricula for undergraduates taking a graduate-level course on cutting-edge topics in arithmetic statistics.
- Led several on independent studies on the topic, in particular, was a prime mentor for Ashwath Rabindranath's junior thesis.

McGraw Fellow **Winter 2010 – Spring 2012**

- Provided (with a co-fellow) the only training provided to graduate students in the Princeton math department before they taught undergraduate courses.
- Focused on implementable strategies for 30+-person classrooms such as Think-Pair-Share.

Head Preceptor for The Magic of Numbers **Spring 2010**

- Helped develop curricula for and gave several lectures for the second iteration of a 180-person course.
- Managed four preceptors and ten graders and the communications between this team and the faculty instructor.

University of Michigan, Ann Arbor, MI
Course Apprentice **Fall 2006 – Winter 2008**

- Instructor for Honors Analysis and Mentor for Explorations in Mathematics
- Responsible for a weekly one-hour lecture, grading, and office hours.
- Mentored freshmen and sophomores in solving small research problems.
- Specialized in helping students with programming, especially in Mathematica.

Instructional Assistant **Winter 2006**

- Head Teaching Assistant and Autograder Czar for EECS 281, the final required data structures course for CS undergrads at the University of Michigan.
- Developed programming projects, homeworks, and exams for second-year data structures/algorithms course.
- With another student, developed a PHP/PERL web-based autograder.
- In charge of hiring and managing of graders.

PROGRAMMING LANGUAGES

Expert: Python and Java

Used professionally: Scala (Spark), PHP, PERL, VBA, Matlab, Magma, Sage, SQL (mostly Redshift, Postgres, and a little PostGIS), JavaScript, and (ever so long ago) AppleScript

Used in side projects: Ruby, Julia, C

Competed with: C++

Taught courses in: Python, Java, SNAP/BYOB (Scratch variant), C++

HUMAN LANGUAGES

Native: English

Reading Proficiency: Spanish

Order-off-the-menu Proficiency: Mandarin

OTHER ACTIVITIES

Kentucky Science and Technology Corporation, Frankfort, KY

Grant Reviewer **January 2016 – Present**

- Frequent out-of-state reviewer for grants for a Commonwealth of Kentucky-funded NSF SBIR grant matching program administered by KSTC.
- Expertise sought for educational technology, general statistics and software applications, and feasibility of business plans.

Met Council, New York, NY

Highly Skilled Volunteer **January 2013 – January 2015**

- With a friend, developed a web app for determining whether low income New Yorkers qualify for SNAP (f.k.a. food stamps)
- Won volunteer of the year award for the work.

Princeton University, Princeton, NJ

Mentoring Möbius, Co-Director **September 2009 – May 2012**

- Coordinated a mentoring program for current and prospective math majors with an emphasis on expanding female participation in the math program.
- Paired interested undergraduates with graduate students who to provide advice and encouragement.

ACADEMIC WORK

Thesis

- *Three Perspectives on n Points in* $\boldsymbol{P}^{n-2}$. Princeton University. January 2013.

Patents

- Three related to cryptographic applications

Refereed Publications

- **Wilson, K.H.**, Karklin, Y., Han, B., and Ekanadham, C. *Back to the basics: Bayesian extensions of IRT outperform neural networks for proficiency estimation*. Educational Data Mining 2016.
- Blanchet-Sadri, F., Fowler, J., Gafni, J.D., **Wilson, K.H.** *Combinatorics on Partial Word Correlations*. Journal of Combinatorial Theory, Series A. Vol. 116, Issue 6, August 2010.
- Blanchet-Sadri, F., Gafni, J.D., and **Wilson, K.H.** *Correlations of Partial Words*, in W. Thomas and P. Weil (Eds.), STACS 2007. LNCS 4393 pp 97-108.

In preparation

- Altuğ, A., Shankar, A., Varma, I., **Wilson, K.H.** *Counting D_4-extensions of **Q***. Current code available at github.com/khwilson/D4.jl.

WHITEPAPERS

- **Wilson, K.H.**, Nichols, Z. *The Knewton Platform: A General-Purpose Adaptive Learning Platform*. January 2015.
- Green-Lerman, H., **Wilson, K.H.**, Kuntz, D. *Reducing the Gap: How Adaptive Follow-Ups Help Struggling Students*. October 2015.

OTHER WRITING

Wilson, K.H. *Thoughts on the future of math education*. Mathbabe.org. June 15, 2016.

INVITED TALKS AND CONFERENCES

- *Learning Analytics Seminar Series*. Teacher's College, Columbia University. April 6, 2016. Invited Speaker. Talk entitled "Exploring Recurrent Neural Networks in Educational Data"
- *Computer-Aided Personalized Education*. Computing Community Consortium. November 12–13, 2015. Invited participant. Determining the Grand Challenges in personalized education in the coming 5–10 years.
- *Inference and Representation*. David Sontag's class for the NYU data science program. October 16, 2015. Guest lecture on building up a simple model of student proficiency from logistic regression.
- *IACAT 2015*. International Association for Computer Adaptive Testing. September 14 – 16, 2015. Keynote address on the distinctions between adaptive learning and adaptive testing.
- *PyData NYC 2014*. PyData. November 22–23, 2014. Invited speaker. Talk on Python-based tools usable for adaptive learning platforms. Code, slides, and exercises at github.com/khwilson/pydata2014.
- *Miniworkshop on arithmetic geometry and related topics*. Department of Mathematics, Kyoto University. April 2012. Invited talk on representation theoretic structures arising in differential graded algebras associated with certain parameterizations of rank n rings.
- *Arithmetic Invariant Theory*. Department of Mathematics, Princeton University. February 2012. Invited talk on representation theoretic structures arising in differential graded algebras associated with certain parameterizations of rank n rings.

- *toorcamp 2009*. toorcamp. July 2009. Invited introductory lecture on elliptic curve cryptography for (non-mathematical but professional) hackers. Delivered in an abandoned nuclear missile for good effect.
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AWARDS

- *Public Education Achieves in Kentucky (PEAK) Award* (very, very shared). Kentucky School Boards Association. December 2015. Given to Lee County Schools in Kentucky for the TEALS program I helped grow and foster there.
- *Volunteer of the Year Award* (shared with Trevor Summers Smith). Met Council in New York. Summer 2013. Given in recognition of a project for centralizing data at the Met Council related to the Supplemental Nutrition Assistance Program (previous Food Stamps), greatly speeding up their work identifying eligible New Yorkers and allowing them to more easily examine their data in the future.
- *NSF Graduate Research Fellowship*. Summer 2008.
- *Princeton Centennial Fellowship*. Princeton University. Summer 2008.
- *Phi Beta Kappa*. University of Michigan. Summer 2008.
- *Karle Award in Math and Natural Sciences*. University of Michigan. Spring 2008. Given to highest achieving graduating senior in the natural sciences at the University of Michigan.
- *Outstanding Graduating Senior in Mathematics*. University of Michigan. Spring 2008.
- *Cornwell Prize in Mathematics*. University of Michigan. Spring 2007. Given to a student at the University of Michigan who, during the previous four years, shall have demonstrated the greatest intellectual curiosity and given the most promise of original study and creative work in Mathematics.
- *Goldwater Fellowship*. Summer 2007.