Eugene Katsevich

Statistics PhD Student

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Education

Stanford University (Stanford, CA), Ph.D. in Statistics, 2019 (expected).
Thesis Advisor: Chiara Sabatti.

Princeton University (Princeton, NJ), A.B. in Mathematics (with Highest Honors), 2014.
Thesis Advisor: Amit Singer.

Experience

Student academic research

PhD student researcher, Stanford University (2015–2019).
I developed novel theory and methodology for multiple testing and variable selection problems with applications to genomics. See [5, 6, 7].

Undergraduate student researcher, Princeton University, (2012–2014).
I designed, studied theoretically, and implemented a novel algorithm to solve the heterogeneity problem of cryo-electron microscopy, which is to reconstruct multiple conformations of a macromolecule based on noisy 2D projections of it from unknown directions. See [3, 4].

Summer internships

Research intern, 23andMe computational biology team (Summer 2018).
I studied methods to borrow information across phenotypes for genome-wide association studies.

Research intern, Toshiba Medical Research Institute USA, (Summer 2013).
I investigated accelerated gradient-based optimization methods for medical imaging applications, speeding up GPU code written in C++ by a factor of three. See [2].

Research intern, Virginia Tech Biomedical Imaging Division, (Summer 2011).
I proved uniqueness and stability for the interior problem of computed tomography, an image reconstruction framework that requires less radiation dose to the patient. See [1].

Workshops

Participant, Simons Institute Workshop on Robust and High-Dimensional Statistics (October 2018).

Participant, Joint UCLA and Stanford Statistical Genetics Programming Workshop (Summer 2016).

Participant, UCLA Computational Genomics Summer Institute short course (Summer 2016).

Fellowships and Funding

- Hertz Fellowship (2014-2019).
- National Defense Science and Engineering Fellowship (2014-2017).
- Department of Energy Computational Sciences Graduate Fellowship (declined for NDSEG)
- Barry Goldwater Scholarship (2012).

Awards

- Statistics Department Teaching Assistant Award (2016).
- George B. Covington Thesis Prize in Mathematics (2014)
- Early election to Phi Beta Kappa (2013; awarded to top 1% of Princeton graduating class).
- Shapiro Prize for Academic Excellence (2011, 2012).
- Freshman First Honor Prize (2011).

Teaching

Courses Taught at Stanford

- STATS 302: Qualifying Exams Workshop, Summer '17 – Graduate Level.
  I led two sessions per week over the course of six weeks to help the first-year PhD students prepare for their applied statistics qualifying exam. This involved solving problems from previous years' qualifying exams and reviewing material. See course website for a sample of the review materials I prepared.

Courses Served as Teaching Assistant at Stanford

- STATS 315A: Modern Applied Statistics: Learning, Winter '18 – Graduate Level.
- STATS 60: Introduction to Statistical Methods: Precalculus, Fall '16 – Undergraduate Level.
- STATS 191: Introduction to Applied Statistics, Winter '16 – Undergraduate Level.
- STATS 203: Introduction to Regression Models and Analysis of Variance, Spring '15 – Graduate level.

Professional Service Activities

- *Reviewer*, Annals of Statistics, Electronic Journal of Statistics, Genetics.
- *Organizer*, Stanford statistics department orientation program for PhD students (2018).
  I proposed this day-long orientation program for incoming first-year students, which consisted of a series of light sessions to introduce students to the department. I recruited other PhD students to lead the sessions, maintained a website with information, and helped run the program.
- *Organizer*, Hertz West Coast Retreat (2017).
  I co-organized this annual retreat for west coast Hertz Fellows, which included inviting leading scientists from academia and industry to give presentations on their research.

- *Academic chair*, Princeton Math Club (2012).
  I ran the weekly Undergraduate Math Colloquium, including recruiting and scheduling faculty speakers. I developed a comprehensive online guide for math majors, contacting at least 15 upperclassmen to contribute articles and course reviews.

- *Head problem writer*, Princeton University Math Competition (2011).
  I was responsible for all problem-writing and beta testing of over 100 total problems across two divisions for this competition, in which several hundred high school students from several countries participated. I wrote geometry tests for the two divisions and led a team of about 10 problem writers.

Presentations

Invited Seminar Presentations

- *Controlling FDR while highlighting distinct discoveries, with applications to GO enrichment analysis.*
  Stanford Biostatistics Workshop, Oct. 11, 2018.

- *Controlling FDR while highlighting distinct discoveries, with applications to GO enrichment analysis.*
  U.C. Berkeley Statistics and Genomics Seminar, Sep. 27, 2018.

Contributed Conference Oral Presentations

- *Gene Ontology enrichment testing: Reconciling FDR control with filtering.*
  Joint Statistical Meetings, Jul. 28–Aug. 2, 2018, in Vancouver, Canada.

- *The multilayer knockoff filter: Controlled multi-resolution variable selection.*
  International Conference on Multiple Comparison Procedures, Jun. 20–23, 2017, in Riverside, California.

Conference Poster Presentations

- *Multi-resolution association analysis for exome-wide sequencing.*
  American Society for Human Genetics, Oct. 16–20, 2018, in San Diego, California.

- *Controlling FDR while highlighting distinct discoveries.*
  Workshop on Higher-Order Asymptotics and Post-Selection Inference, Sep. 8–10 2018, in St. Louis, Missouri.

- *Multilayer FDR control for genetic association studies.*
  Graybill Conference on Statistical Genomics and Genetics, Jun. 5–7 2017, in Fort Collins, Colorado. Best student poster award.

- *The multilayer knockoff filter: Multilayer FDR control for association studies.*
  Probabilistic Modeling in Genomics, Sep. 12–14, 2016, in Oxford, United Kingdom.

Publications and Preprints

[1] **E. Katsevich**, A. Katsevich, and G. Wang. Stability of the interior problem for polynomial region of interest. *Inverse Problems*, 28(6), 2012. Available on PubMed.

[2] B. Shi, **E. Katsevich**, B. Chiang, A. Katsevich, and A. Zamyatin. Image registration for motion estimation in cardiac CT. In *SPIE Medical Imaging*, San Diego, California, February 2014. Available on SPIE digital library.

[3] **E. Katsevich**, A. Katsevich, A. Singer. Covariance matrix estimation for the cryo-EM heterogeneity problem. *SIAM Journal on Imaging Sciences*, 8(1):126–185, 2015. Available on PubMed.

[4] J. Anden, **E. Katsevich**, and A. Singer. Covariance estimation using conjugate gradient for 3D classification in cryo-EM. In *IEEE Int Symp Biomed Imaging*, New York, New York, April 2015. Available on PubMed.

[5] **E. Katsevich** and C. Sabatti. Multilayer Knockoff Filter: Controlled variable selection at multiple resolutions. *Annals of Applied Statistics*, to appear, 2018. Available on arXiv.

[6] **E. Katsevich** and A. Ramdas. Towards "simultaneous selective inference:" post-hoc bounds on the false discovery proportion. *Annals of Statistics*, in revision, 2018+. Available on arXiv.

[7] **E. Katsevich**, C. Sabatti, and M. Bogomolov. Controlling FDR while highlighting distinct discoveries. In submission, 2018+. Available on arXiv.

[8] J. Zhu, Q. Zhao, **E. Katsevich**, C. Sabatti. Exploratory Gene Ontology Analysis with Interactive Visualization. In submission, 2018+. Available on bioRxiv.

Last updated: November 1, 2018