TAKUTO SATO

54 Fairmont St, Cambridge, MA 02139
413-884-2903 | tsato@broadinstitute.org | github.com/takutosato

EDUCATION

University of Massachusetts Amherst, Amherst, MA *August 2020 – Present*
Coursework in Mathematics (Non-degree)

Tufts University, Medford, MA *September 2013 – February 2019*
Master of Science in Computer Science *GPA: 3.83/4.0*

Williams College, Williamstown, MA *September 2008 – June 2012*
Bachelor of Arts in Physics

WORK/RESEARCH EXPERIENCE

Broad Institute of MIT and Harvard, Cambridge, MA *June 2015 – Present*
Senior Computational Associate, Methods Development Group, Data Science Platform

- Analyze, evaluate, and develop quality control metrics for the novel next generation sequencing (NGS) technologies, including contamination, base quality recalibration, somatic variant calling in liquid biopsy, copy-number variation.
- Developer of the Genome Analysis Toolkit (GATK).
- Develop Bayesian probabilistic graphical models for detecting artifactual mutations in cancer DNA.

InterSystems Corporation, Cambridge, MA *July 2012 – June 2015*
Support Advisor/Specialist

- Analyzed and optimized operating systems-level performance of the high-performance database.
- Investigated database corruption, performed data recovery, and resolved time-sensitive disruptions to database operations.

PUBLICATIONS

(Preprint) Benjamin, D., Sato, T., et al. (2019). *Calling Somatic SNVs and Indels with Mutect2*. bioRxiv:861054.

FIELDS OF INTEREST

Undecided. Topology, Geometry.

RELEVANT COURSEWORK (* indicates planned for Spring 2021)

- Math: Intro to Abstract Algebra I & II*, Real Analysis, (Graduate) Analysis I & II*.
- Stats/ML/CS: Statistical Pattern Recognition, Computation Theory, Statistics, (Advanced) Algorithms and Data Structures, Deep Learning for Computer Vision.

TEACHING

Teaching Assistant, Williams College

- Physics 201: Electricity and Magnetism. Physics 202: Waves and Optics.
- Math and Science Resource Center tutor for three semesters.

VOLUNTEERING

Enroot, Cambridge, MA *September 2017 – Present*

- One night a week, meet with a high school student who moved to the United States as a teenager.
- Provide general mentorship and help with math homework.

OTHER INTERESTS

- Running, Soccer, Reading, Nonfiction Writing, Backpacking, Chess, Piano, Swimming.

List of Advanced Math Courses
Takuto Sato

Course Number/Title	Grade	School	Instructor	Dates	Textbook
MATH624/Real Analysis II	Spring 2021	UMass Amherst	Robin Young	Spring 2021	Hunter and Nachtergaele, Applied Analysis
MATH412/Introduction to Abstract Algebra II	Spring 2021	UMass Amherst	Eric Sommers	Spring 2021	Saracino, Abstract Algebra
MATH623/Real Analysis I	A	UMass Amherst	Robin Young	Fall 2020	Royden, Real Analysis Stein and Sakarchi, Real Analysis
MATH411/Introduction to Abstract Algebra I	A	UMass Amherst	Laura Colmenarejo	Fall 2020	Saracino, Abstract Algebra
MA511/Real Analysis	A	Boston university	Thomas Enkosky	Summer 2020	Tao, Analysis I
MATH170/Computation Theory	A	Tufts University	Megan Monroe	Spring 2018	Sipser, Introduction to the Theory of Computation
MATH162/Statistics	A	Tufts University	Patricia Garmirian	Spring 2016	Larsen and Marx, An Introduction to Mathematical Statistics

Material Covered.
(Past courses)
MATH623: Real Analysis I.
General theory of measure and integration; Lebesgue measure; the fundamental theorem of calculus; signed measures, Radon-Nikodym theorem.

MATH411: Introduction to Abstract Algebra I.
Groups, subgroups, symmetric groups; cosets, Lagrange's theorem; normal subgroups, homomorphism; Sylow theorems.

MA511: Real Analysis.
The axiomatic method; limits, sequences, series; derivatives and integrals; continuous functions; types of functional convergence; infinite sets, axiom of choice, partially ordered sets.

MATH170: Computation Theory.
Automata, computability, complexity; regular languages; context-free languages; Turing machines; decidability, reducibility.

MATH162: Statistics.
Hypothesis testing; inference based on the normal distribution; two-sample inferences; goodness-of-fit tests; regression.

(Future courses)
MATH624: Real Analysis II.
Introduction to functional analysis; elementary theory of Hilbert and Banach spaces; functional analytic properties of Lp-spaces, applications to Fourier series and integrals; interplay between topology and measure, Stone-Weierstrass theorem, Riesz representation theorem.

MATH412: Introduction to Abstract Algebra II.
Rings, fields; unique factorization domains; construction with Straightedge and Compass; Galois Theory.