Robert Rennie

faculty.math.illinois.edu/~rennie2 | www.linkedin.com/in/robert-rennie/
rennie2@illinois.edu | 626.590.1893

EDUCATION

UIUC
PH.D STUDENT IN MATHEMATICS
Expected 2021 | Champaign, IL

REED COLLEGE
BA IN MATHEMATICS
May 2015 | Portland, OR

INDEPENDENT UNIVERSITY OF MOSCOW
MATH IN MOSCOW PROGRAM
Spring 2014 | Moscow, Russia

SKILLS

MATH FOCUSES
Algebraic Topology • Applied Topology • Combinatorics • Algebraic Geometry • Category Theory • Homotopy Type Theory

PROGRAMMING LANGUAGES OF CHOICE
Python • Sage • Mathematica • C/C++ • Scala • Haskell • OpenCl • OpenMPI

SELECTED TOOLS
LaTeX• BASH • Docker • Git/Hg • Vimscript • Emacs/Org-mode • HTML/CSS/JS/Bootstrap • Pandas/Seaborn • Sklearn

RELEVANT COURSES
Algorithms and Data Structures • Parallel Algorithms • Theory of Programming Languages • Partial Orders and Combinatorial Optimization • Graph Theory

VOLUNTEERING

- Programming workshop facilitator for incarcerated men through the Education Justice Project
- Undergraduate research mentor with the Illinois Geometry Lab
- High school student mentor with the AVID program
- Outreach through the Association for Women in Mathematics

SUMMARY

I am a Math researcher with a background in Computer Science and some Data Analysis experience. I am looking to branch out into more direct applications of my skills to Machine Learning and AI, especially to automated deduction. I am a strong technical communicator and a *highly* adaptive problem solver.

COMPUTATIONAL RESEARCH SNAPSHOTS

COOPERATING WITH THE PHILOSOPHY OF EMERGENCE TEAM
REED COLLEGE PHILOSOPY OF COMPUTATION COURSE, SPRING 2015
Professor: Prof. Mark Bedau
Why is it that natural life exhibits ever-increasing complexity, yet all existing simulations of evolution fail to produce such complexity? I worked with two Philosophy students to refine their proposed answer, from a philosophical standpoint, and then I implemented from scratch a simulation in python to test their hypothesis.

ADAPTING TO AN UNEXPECTED RESEARCH CHALLENGE
REED COLLEGE UNDERGRADUATE THESIS, FALL/SPRING 2014-2015
Advisor: Prof. Angélica Osorno
In the midst of a year-long process of research into computational approaches toward computing topological invariants of finite spaces, I encountered K-theory, a branch of math entirely unfamiliar and unintuitive to me. Lack of K-theory background seemed to be my main obstacle to progress. So I dedicated months familiarizing myself with the theory (and its prerequisites) until I was able to incorporate it into another potential approach.

PRESERVING THE VISION OF A PROJECT FROM INCEPTION
REED COLLEGE PHILOSOPY OF COMPUTATION COURSE, SPRING 2015
In order to make an argument concerning language authenticity tests for my Philosophy Course, I needed to Markov Chain generator which could use any regular language expression as its basic units. Rather than settle for existing implementations which lacked this additional feature, I simply rearranged my schedule and built it from scratch.

IMMERSING MYSELF INTO AN OPEN-ENDED PROBLEM
MATHEMATICAL SCIENCES RESEARCH INSTITUTE, SUMMER 2014
Advisor: Prof. Victor Moll
In just four weeks, two teammates and I learned enough P-adic Analysis to apply the theory to Combinatorial sequences. I wrote Mathematica experiments which we used to conjecture a beautiful result about the Catalan Numbers and then we proved (and generalized) this result using P-adic Analysis. We presented our work at the Joint Math Meetings in 2015.

EFFECTIVELY EXPLAINING A BIOINFORMATICS PARALLEL ALGORITHM
REED COLLEGE, SUMMER 2012
Research Assistant of Prof. James Fix
With a team of two other students, I researched data structures for indexing large data sets using parallel algorithms with a view toward RNA sequence analysis. In OpenCl, I implemented one such data structure on a graphics processor, after reading the related paper, in order to demonstrate to my research group how it worked.