Nathan Sanford

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Professional Summary

An applied mathematician trained in stochastic processes and scientific computing methods who is interested in applying analytical and computational methods to problems and data sets that have real-world impacts.

Education

- **Northwestern University** — Evanston, Illinois
  Ph.D. in Applied Mathematics — *2013 – expected* ***Winter 2020***
  - **Thesis**: Rare Events in Mode-Locked Lasers
  - **Minor**: Scientific Computing
  - **Committee**: William Kath, David Chopp, Hermann Riecke
- **Seattle University** — Seattle, Washington
  B.S. in Mathematics — *2009 – 2013*
  - **Summa Cum Laude**, **Major GPA**: 4.00/4.00, **Overall GPA**: 3.94/4.00
  - **Specialization**: Applied Mathematics, **Minor**: Philosophy

Work Experience

- **Northwestern University** — Evanston, Illinois
  Research Assistant — *June 2014 – Present*
  - **Advisor**: William Kath, Department of Engineering Sciences and Applied Mathematics
  - Performed large-scale, parallelized, Monte Carlo simulations to quantify error rates in a mode-locked laser model.
  - Investigated algorithmic improvements to importance sampled Monte Carlo schemes in specialized conditions.
  - Identified novel error path features analytically and numerically using rare event and large deviation theory.
  - Catalogued error path behavior using various technologies/languages including AUTO, Python, and XPP.
  - Presented research at conferences, interdisciplinary workshops, and departmental seminars.
- **Northwestern University** — Evanston, Illinois
  Teaching Assistant — *Sept. 2014 – Present*
  - Assisted professors in teaching core and advanced undergraduate math classes for 11 quarters.
  - Provided group instruction in discussion sections and individualized help to students in office hours.
  - Helped create homework assignments, in-class assignments, and exams.
- **Seattle University** — Seattle, Washington
  Research Assistant — *Jan. 2012 – Sept. 2013*
  - **Advisor**: John Carter, Department of Mathematics
  - Investigated stability of steep waves in a shallow water wave model.
  - Utilized a mixture of analytical and numerical techniques to assess solutions' stability.
  - Extended previous stability assessment methods to apply to integro-differential equations.

Programming Skills

- **Languages**: C/C++, Python, LaTeX
- **OS and Software**: Linux, Windows, MATLAB, R, Mathematica

Publications

N. Sanford, G.M. Donovan, and W.L. Kath. *Slip Rates and Slip Modes in an Actively Mode-Locked Laser*, submitted.

N. Sanford, K. Kodama, J.D. Carter, and H. Kalisch. *Stability of traveling wave solutions to the Whitham equation. Physics Letters A*, 2014.