Nathan Sanford

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Professional Summary

A data scientist trained in applied mathematics who is interested in developing and using algorithms to solve problems and analyze data sets that have real-world impacts.

Education

- **Northwestern University** — Evanston, Illinois
  Ph.D. in Applied Mathematics — *2013 – expected* ***Spring 2020***
  - **Thesis**: Rare Events in Mode-Locked Lasers
  - **Minor**: Scientific Computing
- **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*
  - 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.
  - Directed research projects independently while learning and using various languages/platforms autonomously.
  - Collaborated with multi-continent research team on algorithm development and paper drafting.
  - Presented research at conferences, interdisciplinary workshops, and departmental seminars.
- **Northwestern University** — Evanston, Illinois
  Teaching Assistant — *Sept. 2014 – June 2019*
  - Assisted professors in teaching core and advanced undergraduate mathematics classes for 12 quarters.
  - Collaborated with faculty to develop and compose course assessments and materials.
  - Coordinated with 5-15 person teaching teams to organize instruction for lecture sections of over 300 people.
  - Taught students in group settings and provided individualized help to students in office hours.
  - Communicated course concepts to students of various backgrounds throughout the University.
- **Seattle University** — Seattle, Washington
  Research Assistant — *Jan. 2012 – Sept. 2013*
  - Investigated stability of steep waves in an integro-differential shallow water wave model.
  - Utilized a mixture of analytical and numerical techniques to assess solutions' stability.
  - Collaborated weekly with water wave research group at the University of Washington.
  - Wrote code collaboratively with another student that led to a publication.

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