Eric Stansifer `erst@mit.edu`

- Education

    - **West Shore High School**, 2001-2005

    - **California Institute of Technology**, 2005-2010
    I graduated with honors with a B.Sc. in mathematics, with an overall GPA of 3.524 and mathematics GPA of 3.644. I was on sabbatical for the 2007-2008 academic year.

    - **University of York**, 2007-2008
    I was a researcher in Reidun Twarock's mathematical biology group.

    - **Universiteit Leiden** (2010-2011) and **Università degli Studi di Milano** (2011-2012)
    I completed a M.Sc. in mathematics through the ALGANT (Algebra, Geometry, and Number Theory) Erasmus Mundus program; my overall marks were 109 / 110, with full marks on my thesis.

    - **MIT**, 2013-present
    I am pursuing a PhD in the department of Earth, Atmospheric, and Planetary Sciences.

- Publications

    - Stansifer, E.M., O'Gorman, P.A. & Holt, J.I. (2016) Accurate computation of moist available potential energy with the Munkres algorithm. Quarterly Journal of the Royal Meteorological Society `doi:10.1002/qj.2921`

    - Stansifer, E.M. (2012) Leopoldt's Conjecture for Abelian and non-Abelian cases. (Master's thesis)

- pre-PhD Research

    - **Summer Undergraduate Research Fellowship** (SURF) at Caltech, Summer 2006
    I worked with Erik Winfree's DNA computing group on a theoretical computer science project. I proved that mass-action chemical kinetics is Turing universal, i.e., that any Turing machine can be simulated by an appropriate network of chemical reactions.

    - **Researcher** at University of York, October 2007 - June 2008
    I worked for one year at the University of York in Reidun Twarock's mathematical biology group, which investigates theoretical properties of virus capsids. I wrote a program that simulated the construction of the MS2 virus capsid; its results agreed with and gave a deeper understanding of experimental evidence. A secondary project looked at the behavior of quasilattices, which are projections of higher dimensional lattices, as the higher dimensional lattices underwent symmetry-preserving transformations.

    - **Undergraduate project**, Spring 2009
    As an indepedent project in local class field theory, I classified all tamely ramified dihedral extensions of local fields and wrote a complete proof (16 pages) of my results assuming only elementary results of class field theory.

    - **Masters thesis** for Università degli Studi di Milano, March 2012 - December 2012
    I wrote a thesis (50 pages) on Leopoldt's Conjecture, including full proofs from elementary level of both Ax's and Brumer's work on the abelian case of the conjecture, and Masser and Waldschmidt's work on the non-abelian case of the conjecture. I proved one result of my own (for an extension $K/\mathbb{Q}$ with Galois group G, the Leopoldt defect of K is at most $|G| - |G_a|$, where G_a is the abelianization of G) that uses a different technique from previous work.

- Teaching

- **Esoteric Programming Languages and Algorithms** at Caltech, Spring 2010
  Students at Caltech may propose to teach a small-scale class of their own design on a topic that lies outside of the ordinary curriculum. Another student and I taught a class on esoteric programming topics; I gave lectures on the languages Befunge, POV-Ray SDL, FP, J, and postcript, as well as topics in type theory, persistent data structures, and functional programming.

- TA for 12.009/18.352 **Nonlinear Dynamics: The Natural Environment** at MIT, Spring 2017
  I wrote the final exam and one problem set, and taught lectures on quasicrystals and fractals. I received a graduate student teaching award from the department.

- Employment

  - **Research and Development Intern** at Endeca Technologies, Summer 2007
    I was an intern at Endeca Technologies, working on algorithms that, given a set of data, evaluated how closely related a given subset is. I used Java and C++.

  - **Intern** at `imo.im`, Summer 2009
    I was an intern at `imo.im`, where I wrote software to allow users to send files over instant messenger, decreased the primary loading time of the website by a factor of 5, and created and implemented an algorithm to synchronize simultaneous edits to the same text file across multiple computers.

  - **Lead programmer** at `WattTime`, Summer 2013
    WattTime is a company started in spring 2013 that provides hardware and software to decrease the carbon-emissions of electricity usage; for example, by recharging electric vehicles when the electric network is disproportionately sourced from renewable energy. I joined a small group of approximately five people as lead programmer, working on data analysis to determine when the electricity market was most favorable, and writing software to automatically reprogram a thermostat in response to changes in the energy supply.

- Competitions and Exams

  - **ACM International Collegiate Programming Competition** (ICPC)
    An international programming competition for teams of three people from the same university. Those who perform well in the regional competititons advance to the world finals. Individuals may only participate twice in the world finals before retiring from the competition. Coaching at Caltech entails running the Caltech intramural competition (including problem selection), selecting the teams, and preparing the team for the competitions.
    - 2004-2005 (observer). I placed third in the Southeast US regional by myself.
    - 2005-2006 (Caltech). We won the Southern California regional and placed 39th in the world.
    - 2006-2007 (Caltech). I coached the Caltech team, which won the regional and placed 12th (bronze) in the world.
    - 2008-2009 (Caltech). I coached the Caltech team, which won the regional and earned honorable mention in the finals.
    - 2010-2011 (Universiteit Leiden). I won the pre-BAPC (Belgium, Netherlands, Luxembourg) by myself. I was on a team of two which placed second in the BAPC. I was on a team of three which placed third in the NWERC (Netherlands, Belgium, Luxembourg, Germany, Denmark, Sweden, Norway, Finland, the UK, Ireland, and Iceland) and earned honorable mention in the finals.

  - **Putnam Exam**
    The Putnam Exam is the leading mathematics competition amongst university students in North America. Participants solve as many of twelve proofs as they can in six hours. I took the exam in 2006, ranking in the top 100, and in 2009, scoring 71 points and placing 20th, and was one of five participants to solve the hardest problem (B6) of that year.

- ○ **Caltech Physics League**
  The Caltech Physics League is a casual intramural physics-modeling competition, wherein participants have one week to write a paper answering questions from a detailed prompt. I won the first competition (spring 2009), on modeling space debris subject to atmospheric drag.

- ○ **GRE**

  - ∗ GRE General Test: Quantitative Reasoning 170 / 170 (99 percentile), Verbal 170 / 170 (99 percentile), Writing 4.5 / 6 (73 percentile)
  - ∗ GRE Math Subject Test: 910 (99 percentile). The maximum score varies by test edition, typically around 900 to 920.

- ○ **High School Awards**

  - ∗ USA Mathematics Olympiad, top 100 nationwide (each of 2002, 2003, 2005)
  - ∗ USA Computing Olympiad, top 7 nationwide (2005)
  - ∗ USA Biology Olympiad semifinalist, top 500 nationwide (2005)
  - ∗ National AP Scholar (2005)
  - ∗ National Merit Semi-finalist (2005)
  - ∗ Siemen's AP Award (there are 26 Siemen's AP Awards given in the US each year) (2005)
  - ∗ Sunshine State Scholar (math and science competition in Florida, graded equally on an exam, a research paper, and a presentation), first place (2005)
  - ∗ Harvard-MIT Math Competition (2005); our team of eight, representing Florida, placed first in the Guts Round (with 50% more points than the second place team), and I placed third in the Combinatorics individual competition
  - ∗ Commissioner's Academic Competition (a quiz-bowl style competition in Florida covering math, science, and the humanities), first place (2004)

- • Coursework

  - ○ In the summer of 2007, I took a 6-week course on modular forms at Boston University.

  - ○ In the summer of 2005, I took a 6-week course on Bernoulli numbers, L-series, and generalizations of the Riemann Zeta function to the p-adics at Boston University. We saw an outline of Kummer's proof of Fermat's Last Theorem for regular primes.

  - ○ In the 2004-2005 academic year, I took a second-year data structures course, and fourth-year courses on malacious code, neural networks, and real analysis at Florida Institute of Technology.

  - ○ Transcripts from Caltech, Leiden, Milano, and MIT are available on request.