# Stephen Lewis

*5219 Kensington Pl N*
*Seattle, WA 98103*
*(address after 1/1/15)*
*(206)753-9320*
*iam@stephen-lewis.net*
***stephen-lewis.net***

## Professional Experience

8/14-12/14 **Dunham Jackson Asst. Professor**, *University of Minnesota*, Minneapolis, MN.
Instruct and design upper level classes, perform research.

9/09-8/14 **Instructor; RTG-NSF Fellow; TA Mentor; TA**, *University of Washington*, Seattle, WA.
Instruct courses, perform research, train new teachers, TA courses, serve on student committees.

## Education

9/09-8/14 **PhD in mathematics**, *University of Washington*, Seattle, WA.

8/05-5/09 **BA in mathematics, minor in CS, summa**, *University of Colorado*, Boulder, CO.

Relevant Coursework: Algorithmic Spectral Graph Theory, Martingales, Probability, Data Structures, Algorithms, AI, Combinatorics, Num. Analysis, Alg. of Molecular Bio.

## Programming Experience

Languages: Python/Numpy/SciPy (6 years math research), C++ (2 years CS studies), LaTeX(8 years), jQuery/HTML/CSS/Javascript (2 years casual web development)

Sample Project Summary: Confirmed the validity of a proposed variational method by designing a Python package which could compute solutions to many (∼20,000) PDE while running a geometric optimization search in under 3 hours using object oriented design, sparse matrices, simulated annealing.

## Courses Taught

Upper Div. Applied Linear Algebra (**web**), Real Analysis (grad.), Linear Analysis, Advanced Multivariable Calc.

## Core Strengths

**Adaptability**: several areas of research and study.
**Passionate and self-driven learning**: self-taught in Python.
**Culture building**: founded the **UW Grad Student Analysis Seminar** (with 24 members) and trained replacement organizers.
**Effective communication**: multiple collaborations and several research talks.

## Research and Publications

Geometry: We here develop a general theory for tangents of singular sets and provide a framework to study the local structure of a set based on its tangents. For example, we classify when a set decomposes into a large smooth piece with small singularities based through its tangents.

- J. w/ Matt Badger. *Local set approximation: Mattila-Vuorinen type sets, Reifenberg type sets, and tangent sets.* arXiv ref:1409.7851
- *Singular points of Hölder asymptotically optimally doubling measures.* arXiv ref:1301.1993

Combinatorial Algebra: The full representation theory of the family of groups $U_n(q)$ is intractable. However, much of the theory (such as random walks) can be tractably described through supercharacters.

- J. w/ M. Aguiar et al. *Supercharacters, symmetric functions in noncommuting variables, and related Hopf algebras.* Advances in Math 229 (2012), no. 4, 2310-2337.
- J. w/ Nat Thiem. *Nonzero coefficients in restriction and tensor products of supercharacters of $U_n(q)$.* Advances in Math 227 (2011), 40-72.

Theses: Doctoral and senior theses available at **stephen-lewis.net**

## Other Accomplishments

- One of three recipients of the Academic Excellence Award in the UW math dept. (2010)
- Invited talks at U. de Grenoble, U. de Paris Sud XI, U. of Minnesota, two AMS Special Sessions