

# KARTHIK IYER

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<https://iyer-karthik.github.io/> | <https://github.com/iyer-karthik>

Analytical and innovative professional with 8+ years of combined educational and professional experience in mathematics. Possesses mastery in mathematical techniques, applying this fundamental knowledge to extensive research in seeking effective approaches to handle unsolved problems. Leverages strong ability in critical and creative thinking to thoroughly analyze large data sets. Proficient in multiple programming languages. Collaborates with senior advisors, colleagues, and students to acquire and share expertise.

## CORE COMPETENCIES

- Quantitative Research
- Technical Paper Writing
- SQL & Relational Databases
- Data Analysis & Visualization
- Statistical Analysis
- Team Collaboration
- Programming
- Algorithmic Thinking
- Problem Resolution

## PROFESSIONAL EXPERIENCE

**Research Assistant / Instructor / Teaching Assistant** | [University of Washington](#)

**Sep. 2012 – Present**

### Key Responsibilities:

- Research:** Conducted extensive research on inverse problems in partial differential equations, involving reading mathematics papers to seek unsolved problems worthy of investigation. Reviewed existing literature to analyze related problems, learn techniques as well as develop original methods in order to solve problems of study. Produced 2 papers for separate problems, outlining the techniques used in successfully solving the problems.
- Course Instruction:** Taught basic and advanced multi-variable calculus for junior and sophomore engineering students. Thoroughly explained underlying theories and provided step-by-step demonstrations in solving mathematical problems.
- Class Management:** Carried out lectures and labs for classes ranging from 50 to 80 students. Prepared course schedule, ensuring students completed readings on assigned topic each week. Created and graded assignments, quizzes and exams according to prescribed curriculum and evaluation guidelines.
- Student Assistance:** Conducted office hours for students, providing one-on-one guidance to explain studied concepts, homework problems, and correct methods in order to meet high student success rates.

**Junior Visiting Scholar** | [Hong Kong University of Science & Technology](#)

**Sep. 2016 – Dec. 2016**

### Key Responsibilities:

- Research:** Conducted comprehensive research on uniqueness in inverse problems with low regularity of coefficients in elliptic partial differential equations.

## EDUCATION

**PhD, Mathematics** | [University of Washington](#)

**Sep. 2012 – May 2018 (expected)**

Relevant Coursework: Scientific Computing | Numerical Linear Algebra | Numerical Boundary Value Problems | Stochastic Calculus for Finance | C++ for Finance | Monte Carlo Methods in Finance | Statistical Inference | Machine Learning for Computational Finance

**Master of Science, Mathematics** | [Tata Institute of Fundamental Research](#)

**Aug. 2010 – May 2012**

**Bachelor of Science, Mathematics** | [University of Mumbai](#)

**Jul. 2007 – May 2010**

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**PUBLICATIONS**

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- **Determining rough first order perturbations of the polyharmonic operator**: Analyzed boundary data of a polyharmonic equation's domain, discovering different equation families shared the same rough parameters. Wrote and submitted paper, which is currently under review.
- **Cloaking for a quasi-linear elliptic partial differential equation**: Explored a non-linear operator in a partial differential equation model, discerning specific parameters inside the body were invisible to certain boundary measurements. Wrote and submitted paper outlining mathematical techniques capable of non-linear cloaking, which is set to be published in *Inverse Problems & Imaging*.

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**SELECTED PROJECTS**

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- **OpenStreetMap Data Wrangling**: Performed data wrangling procedures to decompress over 280 MB data set in XML file format, which exhibited the Seattle area in OpenStreetMap. Programmatically cleaned and transformed large volume of data into CSV format using Python, importing it into a database and ran SQL queries to extract meaningful information.
- **Mashable Exploratory Data Assessment**: Used R programming language to explore features affecting the popularity of Mashable news articles. Extensively used *ggplot2* and *dplyr* packages to visually investigate dependence of predictors such as genre, publication subjectivity, tone, and multimedia on the number of shares of an article.
- **Back Testing Trading Strategy**: Wrote code, sourcing data from external website and using numerous R packages, to quantitatively back test the RSI trading strategy. Performed walk forward analysis, used Monte Carlo simulations, continuously optimized parameters and used different performance measures to determine the effectiveness of the trading strategy.

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**AWARDS & RECOGNITION**

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- **Received a full scholarship** from the Tata Institute of Fundamental Research to complete master's degree.
- **Finished in the top 1.5% in the graduating class of 2010, outperforming 1000+ students** at the University of Mumbai.
- **Recognized in the top 16 at the 2010 Madhava Mathematics Competition**, involving college undergraduates in India and hosted by the National Board of Higher Mathematics.

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**TECHNICAL PROFICIENCIES**

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Python | R | C++ | MATLAB | LaTeX | SQL | Git | Microsoft Office (Word, Excel, PowerPoint)