# C. Carlo Fazioli

### Curriculum Vitae

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carlofazioli

I am a research scientist and software engineering generalist with experience in cloud computing and artificial intelligence. I am a lifelong learner confident in my ability to rapidly cultivate new knowledge, as well as drill down into concept details.

### Current Position

2018 – Present **Software Engineer**, *Group W, Inc.*, Vienna VA.

Main contributor on a 2021 MORS (Military Operations Research Society) Barchi prize winning, multi-year, multi-million dollar DARPA contract to develop an AI wargaming application. Project responsibilities include:

- o Architecting a microservice application with Kubernetes/Docker:
  - on a private 11-node 1,240 CPU cluster
  - on Microsoft Azure, using AKS, AAD, ACR and more
- Designing Al algorithms with NNs, MCTS, and RL
- Developing application source code with python, bash, Django, and GNU Make
- Constructing an application API to support front end Vue developers
- Managing GitLab issues, branches, merges, releases, and testing/deployment pipelines for a team of 6 developers
- o Administrating MongoDB from the mongo shell, and with pymongo

General corporate responsibilities include:

- Reviewing academic research literature
- Contributing to contract proposal BD

Managing interns

Briefing industry stakeholders

#### Education

2006 – 2009 Ph.D. Mathematics, University of Illinois at Chicago, Chicago IL.

2005 – 2006 M.S. Mathematics, University of Illinois at Chicago, Chicago IL.

2000 – 2004 B.S. Mathematics, University of San Francisco, San Francisco CA.

#### Previous Positions

2016 - 2018 Econometric Modeler, International Monetary Fund, Washington DC.

Collaborated with IMF economists on economic model development; researched, designed, and implemented algorithms for use by IMF staff; pursued exploratory research into technology solutions for IMF institutional needs; addressed technical needs of individual IMF staff.

- Researched Monto Carlo techniques to approximate game- theoretical quantities, resulting in substantial runtime improvements
- o Authored user software to assist economists in global systemic risk valuations
- Developed working knowledge of AWS, including IAM, VPC, EC2, and SE, for internal pilot program

## 2013 – 2016 **Assistant Teaching Professor**, *Dept. of Mathematics*, Drexel University, Philadelphia, PA.

Developed course and lab materials; lectured, graded exams, monitored students' use of online resources, assigned final grades; assisted students as needed outside of class or in office hours; directed teaching assistants.

- Complex Variables and Vector Analysis (Spring 2014)
- o Differential Equations (Winter 2014, Spring 2015, Winter 2016)
- o Linear Algebra (Fall 2013, Winter 2014, Winter 2015, Spring 2016)
- Discrete Math (Summer 2014)
- o Multivariable Calculus, Calculus II, Precalculus, Math 101 (multiple quarters)

## 2011 – 2013 **Postdoctoral Research Associate**, *Dept. of Mathematical Sciences*, New Jersey Inst. of Tech., Newark, NJ.

Researched, designed, and coded novel algorithms for use in fluid dynamics simulations; briefed research supervisor; presented findings to collaborators and conference attendees.

- Surveyed recent research literature
- Communicated and collaborated with supervisors to develop research program
- o Drafted, wrote, revised, and debugged new numerical algorithms

#### 2011 – 2012 Lecturer, DMS, NJIT, Newark, NJ.

Worked with course coordinators to develop course materials; lectured courses, graded exams, monitored students' use of online resources; assisted students as needed outside of class or in office hours.

- o Differential Equations (Fall 2011)
- Honors Multivariable Calculus (Spring 2012)

#### 2009 - 2011 Lecturer, Dept. of Math, Stats, and Comp. Sci., UIC, Chicago, IL.

Worked with course coordinators to develop course materials; lectured courses, graded exams, monitored students' use of online resources; assisted students as needed outside of class or in office hours. Directed teaching assistants in designing and administering discussion sections and quizzes.

- Linear Algebra course coordinator (Spring 2011)
- o Linear Algebra (Fall 2010, Spring 2010, Fall 2009)
- o Differential Equations (Spring 2011)
- o Multivariable Calculus (Fall 2010, Fall 2009)

#### 2007 – 2009 Graduate Student Lecturer, MSCS, UIC, Chicago, IL.

Lectured courses; wrote and graded exams; assissted students as needed during office hours and scheduled meetings; assigned final grades.

- Linear Algebra (Spring 2008)
- o Multivariable Calculus (Spring 2009, Fall 2007)

#### 2005 – 2009 **Teaching Assistant**, MSCS, UIC, Chicago, IL.

Led discussion sections; created and graded quizzes; assisted students as needed in office hours and department tutoring center.

- Linear Algebra (Summer 2007)
- o Differential Equations (Summer 2006)
- o Calculus II (Fall 2008, Summer 2008, Spring 2005)
- o Calculus I (Spring 2008, Spring 2007, Fall 2006, Spring 2006, Fall 2005)
- o Calculus I Emerging Scholars Program (Spring 2007, Fall 2006)

#### 2002 Supplemental Instruction Tutor, Dept. of Mathematics, USF, San Francisco, CA.

Attended lectures and took notes for undergraduate courses; hosted drop-in peer tutoring sessions.

- Calculus I (Spring 2002)
- Introduction to Statistics (Fall 2002)

#### **Publications**

M. Booty, C. Fazioli, M. Siegel. "A New Algorithm for Efficient Computation of Moving Fluid Interfaces." (in progress)

C. Fazioli, D. Nicholls. "Stable Computations of Variations of Dirichlet-Neumann Operators." *Journal of Computational Physics*, Volume 229, Number 3, 906-920 (2010) C. Fazioli, D. Nicholls. "Parametric Analyticity of Functional Variations of Dirichlet-Neumann Operators." *Differential and Integral Equations*, Volume 21, Number 5-6, 541-574 (2008)

#### Invited Talks

- 2014 Overlapping Patches for Dynamic Surface Problems, Conference on Hamiltonian PDE, The Fields Institute for Research in Mathematical Sciences, University of Toronto, Toronto, Ontario, Canada
- 2012 Overlapping Patches for Dynamic Surface Problems, Applied Math Seminar, Department of Mathematics, Drexel University, Philadelphia PA
- 2009 Functional Variations of the Dirichlet-Neumann Operator, IMACS Conference, University of Georgia, Athens GA
- Functional Variations of the Dirichlet-Neumann Operator, AMS Sectionals Meeting, University of Illinois at Urbana-Champaign, Urbana-Champaign IL

#### Conferences Attended

- 2014 Joint Mathematics Meetings, Baltimore MD
- 2014 Conference on Hamiltonian PDE, Toronto, Ontario, Canada
- 2012 Frontiers in Applied and Computational Mathematics, NJIT, Newark NJ
- 2011 Joint Mathematics Meetings, New Orleans LA
- 2009 IMACS Conference, University of Georgia, Athens GA
- 2009 AMS Sectionals, University of Illinois at Urbana-Champaign, Urbana-Champaign IL
- 2009 Joint Mathematics Meetings, Washington DC
- 2005 3-Manifolds and Knot Theory Conference, University of Texas at Austin, Austin TX
- 2005 Algebraic Geometry, Symplectic Geometry and Theoretical Physics: A Conference Celebrating the Contributions of Women Researchers, Philadelpha PA

#### Service

- Summer 2015 Students Tackling Advanced Research (STAR) Faculty Mentor, Drexel University, Philadelphia, PA
  - 2014 2015 Teaching Innovations Committee Head, Drexel University, Philadelphia, PA
  - 2008 2009 Faculty Partner, UIC, Chicago IL
  - Spring 2005 Associate Organizer, Bay Area Math Meet, USF, San Francisco, CA
  - Spring 2004 Student Volunteer, BAMM, USF, San Francisco, CA

#### Hobbies and Interests

- Solving the NYT crossword puzzle daily
  Science fiction lit/TV/movies
- Running, cycling, and yoga
- Cloud computing

- Advent of Code and CTFs
- Bug bountying and cybersecurity