

Felipe Gutierrez Barragan

Research Interests

Scientific computing, machine and statistical learning, high-performance computing, physics-based modeling and simulation, and non-parametric statistics.

Education

2016– **Ph.D. Candidate, Computer Science**, *University of Wisconsin-Madison*.

2012–2016 **BS. Applied Math, Engineering & Physics**, *University of Wisconsin-Madison*.

Advisor: Dan Negrut. Senior Project: "Modeling and simulation of fluid-solid interaction problems on distributed memory architectures using the Charm++ parallel programming paradigm"

2012–2016 **BS. Computer Science (Honors)**, *University of Wisconsin-Madison*.

Advisor: Vikas Singh. Thesis: "A framework for designing fast and robust permutation testing using matrix completion: Applications to neuroimaging"

Positions Held

Academic/Research

2013–present **Research Assistant**, *Simulation-Based Engineering Lab*, Madison, WI.

- Investigate and implement parallel programming techniques and technologies to develop a distributed memory fluid-solid interaction engine.
- Developed the full-stack of a web app that records and displays the performance and testing metrics of *Chrono*.
- Write web-based and scripting programs for pre and post processing tasks.

2015–present **Research Assistant**, *Wisconsin ADRC Imaging Group*, Madison, WI.

- Developed RapidPT, an open-source MATLAB toolbox for fast and efficient permutation testing with state of the art performance. The permutation testing procedure is accelerated through low-rank matrix completion.

Industry

Summer 2016 **SW Performance Intern**, *Cray Inc*, St Paul, MN.

Summer 2014 **Explorer Intern**, *Microsoft Corporation*, Seattle, WA.

- Performed the overall development of the UX that allows Maps app users to interact with the available layers. The UX addressed desktop, phone and tablet.

Previous Positions

Summer 2013 **Student Help**, *Madison Plasma Dynamo Experiment*, Madison, WI.

2012–2013 **Web Developer**, *Dept. of Nutritional Sciences*, Madison, WI.

Publications

In **Felipe Gutierrez**, Vamsi Ithapu, Sterling C. Johnson, Vikas Singh. An SnPM toolbox for fast permutation testing using matrix completion. *In Preparation*.

IDETC/DIE **Felipe Gutierrez**, Arman Pazouki, Dan Negrut. Distributed Memory Fluid-Solid Interaction Simulations
2016 via Chrono::HPC. *ASME IDETC/CIE*, 2016. Abstract Accepted.

IDETC/CIE Daniel Kaczmarek, Aaron Bartholomew, **Felipe Gutierrez**, Hammad Mazhar, Dan Negrut.
2014 Chrono::Render: A graphical visualization pipeline for multibody dynamics simulations. *ASME IDETC/CIE*, 2014.

Awards/Honors

2015 Blue Waters Student Internship Program - National Center for Supercomputing Applications

- 2014 Frontier Fellowship - Wisconsin Institutes for Discovery
 2013 Welton Honors Summer Sophomore Apprenticeship Grant - Honors Program

Presentations

- 2015 **Machine-Ground Interaction Consortium**, Madison, WI.
 ○ Leveraging Charm++ for meshless fluid simulations on distributed memory architectures.
- 2016, 2013 **UW-Madison Undergraduate Symposium**, Madison, WI.
 ○ Distributed Memory Fluid-Solid Interaction Simulations (2016)
 ○ Small Radio Telescope Probes Dark Matter (2013)

Computer Skills

- 10,000+ lines C, C++, Matlab.
 1,000+ lines Python, Java, Javascript, C#.
 Parallel Tools CUDA, Charm++, MPI, OpenMP, ArrayFire.
 Tools Unix-based systems, CMake, Makefiles, Git, L^AT_EX, Mex, Armadillo, PostgreSQL, SQLAlchemy.
 Web and App HTML/CSS, WebGL, Three.js, Flask, Windows App Dev.

Outreach and Leadership

- ProCSI Co-coordinator of Promoting the Computational Science Initiative outreach program in 2013 and 2015. Directed CAD and intro to programming modules.
- Alfabetizacion Volunteer tutor once a week for groups of 2-4 elementary and middle school children in math and english (2010-2011).
- Waterski UW-Madison Waterski team captain, trick coach and competing member.

Coursework

- Graduate Computer Vision, Stochastic Processes, Computational Cognitive Sciences and Electronic Aids in Measurement.
- Comp. Sci Data Structures, Algorithms, Artificial Intelligence, Databases, Operating Systems.
- AMEP Math: 31 credits, Physics: 28 credits, Engineering: 25 credits.

Languages

- Spanish **Fluent** *Native Language*
- English **Fluent** *12 years of study. Lived and studied in the US for 4+ years.*
- French **Intermediate (B1+ level)** *2 years of study. Studied 6 months in France.*

References

Professor Vikas Singh

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Dr. Arman Pazouki

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Professor Dan Negrut

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Dr. Radu Serban

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