1520 Madison St
Madison, WI 53711
+1 (608) 957 4234
fgutierrez3@wisc.edu
felipegb94.github.io
Github: felipegb94

# Felipe Gutierrez Barragan

## Research Interests

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

## Education

Fall 2016 (Anticipated) **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 Preparation **Felipe Gutierrez**, Vamsi Ithapu, Sterling C. Johnson, Vikas Singh. An SnPM toolbox for fast permutation testing using matrix completion. *In Preparation.*

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

IDETC/CIE 2014 Daniel Kaczmarek, Aaron Bartholomew, **Felipe Gutierrez**, Hammad Mazhar, Dan Negrut. 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

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|---|---|
| 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, LaTeX , Mex, Armadillo, PostgreSQL, SQLAlchemy. |
| Web and App | HTML/CSS, WebGL, Three.js, Flask, Windows App Dev. |

## Outreach and Leadership

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|---|---|
| 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

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|---|---|
| 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

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|---|---|---|
| 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

Associate Professor
Department of Computer Science
UW-Madison
vsingh@biostat.wisc.edu
608 262 8875

### Professor Dan Negrut

Vilas Associate Professor
Department of Mechanical Engineering
UW-Madison
negrut@wisc.edu
608 262 8875

### Dr. Arman Pazouki

Research Associate
Department of Mechanical Engineering
UW-Madison
pazouki@gmail.com

### Dr. Radu Serban

Associate Scientist
Department of Mechanical Engineering
UW-Madison
serban@wisc.edu