

# Miguel Velez

*Ph.D. Student in Software Engineering*

Carnegie Mellon University  
School of Computer Science  
Institute for Software Research  
✉ [mvelezce \[at\] cs.cmu.edu](mailto:mvelezce@cs.cmu.edu)

🌐 <http://www.cs.cmu.edu/~mvelezce/>

in [miguelvelezmj25](#)

*"I never want to reach the point in my life where I've already  
done the most epic thing I will ever do" -Anonymous*

## Education

- 2016 - Present **Ph.D. in Software Engineering**, Carnegie Mellon University, Pittsburgh, PA, USA.  
Advisor: Christian Kästner. Thesis Topic: White-Box Analysis of Configurable Systems.
- 2016 - 2020 **M.Sc. in Software Engineering**, Carnegie Mellon University, Pittsburgh, PA, USA.
- 2010 - 2015 **B.A. in Computer Science (Physics minor)**, University of St Thomas, St. Paul, MN, USA.  
Summa Cum Laude. Major and Minor GPA: 4.00/4.00. Cumulative GPA: 3.99/4.00.  
Advisor: Patrick Jarvis. Summa Cum Laude paper: "Current and Future Relationships Between Robots and Humans".

## Research Experience

- 2016 - Present **Graduate Research Assistant**, Carnegie Mellon University, Pittsburgh, PA, USA.
- Spring 2019 **Teaching Assistant - Analysis of Software Artifacts (Graduate course)**, Carnegie Mellon University, Pittsburgh, PA, USA.
- Fall 2018 **Teaching Assistant - Foundations of Software Engineering (Undergraduate course)**, Carnegie Mellon University, Pittsburgh, PA, USA.
- Summer 2015 **Research Intern**, Massachusetts Institute of Technology, Cambridge, MA, USA.
- 2014 - 2015 **Undergraduate Student Researcher**, University of St. Thomas, St. Paul, MN, USA.

## Industry Experience

### Full-time

- 2016 **Application Developer/Software Engineer**, Sportradar US, Minneapolis, MN, USA.  
Developed a Ruby ETL application that provided data for the NFL Radar360 research tool.

### Internships

- Summer 2020 **Software Engineering Intern**, Google, Remote, PA, USA.  
Collected and surfaced metrics corresponding to RPC behavior during integration tests.
- Summer 2019 **Software Engineering Intern**, Google, Sunnyvale, CA, USA.  
Designed and implemented a data federation GraphQL layer in CDAP/Cloud Data Fusion.
- Summer 2018 **Software Engineering Intern**, Google, Mountain View, CA, USA.  
Improved Suggest's ranking of contact actions in the Android Google Search App.

- Fall 2015 **Application Developer/Software Engineer**, *Sportradar US*, Minneapolis, MN, USA.  
Built a Ruby monitoring application to parse and build Formula 1 feeds.
- Spring 2015 **Jr. Application Developer**, *SportsData/Sportradar US*, Minneapolis, MN, USA.  
Implemented a Ruby application to parse and build MLB feeds.
- 2013 - 2014 **Cloud Developer Intern**, *Valtira*, Minneapolis, MN, USA.  
Developed web applications with Java servlets, AngularJS, and MySQL databases.

## Publications

### Refereed Journal Articles

- [1] **M. Velez**, P. Jamshidi, F. Sattler, N. Siegmund, S. Apel, and C. Kästner. "ConfigCrusher: Towards White-Box Performance Analysis for Configurable Systems". In *Autom Softw Eng* (2020).

### Refereed Conference Publications

- [5] **M. Velez**, P. Jamshidi, N. Siegmund, S. Apel, and C. Kästner. "White-Box Analysis over Machine Learning: Modeling Performance of Configurable Systems - Supplementary Material - <https://bit.ly/3bbbG8>". In *Proc. Int'l Conf. Software Engineering (ICSE)*. Madrid, Spain: IEEE, May 2021.
- [4] P. Jamshidi, **M. Velez**, C. Kästner, and N. Siegmund. "Learning to Sample: Exploiting Similarities Across Environments to Learn Performance Models for Configurable Systems". In *Proc. Int'l Symp. Foundations of Software Engineering (FSE)*. Lake Buena Vista, FL, USA: ACM, Nov. 2018, pp. 71–82. (21% acceptance rate).
- [3] P. Jamshidi, N. Siegmund, **M. Velez**, C. Kästner, A. Patel, and Y. Agarwal. "Transfer Learning for Performance Modeling of Configurable Systems: An Exploratory Analysis". In *Proc. Int'l Conf. Automated Software Engineering (ASE)*. Urbana-Champaign, IL, USA: ACM, Oct. 2017. (21% acceptance rate).
- [2] P. Jamshidi, **M. Velez**, C. Kästner, N. Siegmund, and P. Kawthekar. "Transfer Learning for Improving Model Predictions in Highly Configurable Software". In *Proc. Int'l Symp. Software Engineering for Adaptive and Self-Managing Systems (SEAMS)*. Buenos Aires, Argentina: IEEE, May 2017, pp. 31–41. (23% acceptance rate).
- [1] **M. Velez**, J. Sawin, A. Ingerson, and D. Chiu. "Improving Bitmap Execution Performance Using Column-Based Metadata". In *Int'l Conf. Future Internet of Things and Cloud (Fi-Cloud)*. Vienna, Austria: IEEE, Aug. 2016, pp. 371–378. (30% acceptance rate).

### Technical Reports

- [1] **M. Velez**, P. Jamshidi, F. Sattler, N. Siegmund, S. Apel, and C. Kästner. *ConfigCrusher: Towards White-Box Performance Analysis for Configurable Systems*. Tech. rep. 1905.02066v2. arXiv, July 2020.

### Ph.D. Thesis Proposal

- [1] **M. Velez**. *White-box Analysis for Modeling and Debugging the Performance of Configurable Systems*. Dec. 2020.

## Miscellaneous

- [7] **M. Velez**, P. Jamshidi, C. Kästner, N. Siegmund, F. Sattler, and S. Apel. *White-Box Performance Discovery*. Poster. Google PhD Intern Research Conference. Sunnyvale, CA, USA, July 2019.
- [6] **M. Velez**, P. Jamshidi, C. Kästner, N. Siegmund, F. Sattler, and S. Apel. *White-Box Performance Discovery*. Poster. BRASS PI Meeting. Seattle, WA, USA, Nov. 2017.
- [5] **M. Velez** and J. Sawin. *Improving the Efficiency of CHA through Parallelization*. Poster. Inquiry at St. Thomas. St. Paul, MN, USA, May 2016.
- [4] **M. Velez** and J. Sawin. *Faster WAH Compression Querying through the Use of Metadata*. Poster. Consortium for Computing Sciences in Colleges Midwest Region. 1<sup>st</sup> place Discovery Track. Evansville, IN, USA, Oct. 2015.
- [3] **M. Velez** and A. Solar-Lezama. *Simpler Implementation of Sketches through Enhanced Expressiveness*. Poster. MIT Summer Research Poster Session. Cambridge, MA, USA, Aug. 2015.
- [2] **M. Velez**. *Current and Future Relationships Between Robots and Humans*. Summa Cum Laude Paper. Apr. 2015.
- [1] **M. Velez**, P. Gittins, and J. Sawin. *Extending SMILES to Encode Reaction Mechanisms*. Poster. Inquiry at St. Thomas. St. Paul, MN, USA, May 2014.

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## Awards and Honors

- 2019 **CMU's ISR Presidential Fellowship**. \$50,000
- 2015 **MSRP Research Internship at MIT**. Acceptance rate: 10.5%
- 2015 **CCSC:MW 1<sup>st</sup> place Student Posters & Showcase Discovery Track**. \$100
- 2015 **UST Student Travel Grant**. \$750
- 2014, 2015 **UST Collaborative Inquiry Grant**. \$2,000
- 2012 **UST International Student Leadership Scholarship**. \$500
- 2011 - 2015 **Bev and Pat Flaherty Scholarship**. \$14,000
- 2010 - 2015 **University of St. Thomas International Scholarship**. \$80,000
- 2010 - 2015 **University of St. Thomas Tuition Scholarship**. 40% discount
- 2008 - 2009 **American Field Service International Scholarship**.

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## Service

### Committees

- 2019 - 2021 MIT Summer Research Program Application Review
- 2019 CMU ISR-SE Ph.D. Admissions
- 2017 CMU REU-SE Admissions

## Reviewing

2020 TSE Reviewer  
2020 ASE'20 Sub-Reviewer  
2019 ICSE'20 Sub-Reviewer  
2019 ASE'19 Sub-Reviewer  
2019 ESEC/FSE'19 Sub-Reviewer  
2018 ICSE-NIER'19 Sub-Reviewer  
2017 ICSE'18 Sub-Reviewer  
2017 ASE'17 Sub-Reviewer  
2017 ESEC/FSE'17 Sub-Reviewer  
2016 ICSE'17 Sub-Reviewer

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## Other Interests and Activities

2018 - 2020 Hispanic Googler Network  
2014 - 2015 UST Game Design Club  
2013, 2015 Note taker. Helped two students with disabilities to take notes in class  
2012 - 2015 UST Computer Science Consultant  
2011 - 2015 UST Computer Science Club  
2010 - 2015 UST Globally Minded Student Association  
2012 - 2013 St. Thomas Activities and Recreation President  
2011 - 2012 St. Thomas Activities and Recreation Intern  
2010 - 2012 UST Spanish Tutor  
2011 2 STEM Learning Communities  
2010 - 2011 UST Morrison Hall Council

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## References

### Christian Kästner

Institute for Software Research  
Carnegie Mellon University  
✉ kaestner [at] cs.cmu.edu  
☎ +1 412 268 5254

### Edwin Elia

Cloud Data Fusion  
Google  
✉ edwinelia [at] google.com  
☎ +1 608 320 5404

### Mark Wakabayashi

Server Test & Configuration  
Google  
✉ mwaka [at] google.com

### Pooyan Jamshidi

Computer Science and Engineering  
University of South Carolina  
✉ pjamshid [at] cse.sc.edu  
☎ +1 412 519 8405

**Norbert Siegmund**  
Institute of Computer Science  
Universität Leipzig  
✉ norbert.siegmund [at]  
uni-leipzig.de  
☎ +49 341 97 32341

**Sven Apel**  
Saarland Informatics Campus  
Universität des Saarlandes  
✉ apel [at] cs.uni-saarland.de  
☎ +49 681 302 57210