

Miguel Velez

Carnegie Mellon University
School of Computer Science
Institute for Software Research
✉ mvelezce@cs.cmu.edu

🌐 <http://www.cs.cmu.edu/~mvelezce/>
📄 [miguelvelezmj25](#)

Ph.D. Student in Software Engineering

*"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 - 2021 **Doctor of Philosophy in Software Engineering**, Carnegie Mellon University, Pittsburgh, PA, USA
Advisor: Christian Kästner. Dissertation: "Debugging the Performance of Configurable Software Systems: A Human-Centered White-box Approach"
- 2016 - 2020 **Master of Software Engineering**, Carnegie Mellon University, Pittsburgh, PA, USA
- 2010 - 2015 **Bachelor of Arts in Computer Science**, University of St. Thomas, St. Paul, MN, USA
Summa Cum Laude. Physics minor. 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"

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 2021 **Software Engineering Intern**, Google, Remote, USA
Designed and implemented a CLI/REPL to iteratively explore various performance regression analyzers
- Summer 2020 **Software Engineering Intern**, Google, Remote, 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

Research Experience

- 2016 - 2021 **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

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". In *Proc. Int'l Conf. Software Engineering (ICSE)*. Madrid, Spain: IEEE, May 2021. (23% acceptance rate).
- [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 (FiCloud)*. 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. 1st 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.

Awards and Honors

- 2019 **CMU's ISR Presidential Fellowship.** \$50,000
- 2015 **MSRP Research Internship at MIT.** Acceptance rate: 10.5%
- 2015 **CCSC:MW 1st 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.**

Service

Committees

- 2019 - 2022 MIT Summer Research Program Application Review
- 2019 CMU ISR-SE Ph.D. Admissions
- 2017 CMU REU-SE Admissions

Reviewing

- 2021 JSS Reviewer
- 2020 TSE Reviewer

Sub-Reviewing

- 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

Other Interests and Activities

- 2018 - 2021 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

References

Christian Kästner

Institute for Software Research
Carnegie Mellon University
✉ kaestner [at] cs.cmu.edu

Justin Bishop

Performance Testing
Google
✉ jubi [at] google.com

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

Norbert Siegmund

Institute of Computer Science
Universität Leipzig
✉ norbert.siegmund [at]
uni-leipzig.de

Sven Apel

Saarland Informatics Campus
Universität des Saarlandes
✉ apel [at] cs.uni-saarland.de