# Miguel Velez

*Software Engineer*

*Google - Geo - Field Tasking*
*miguelvelez [at] google.com*
*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 - 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

2022 - Present **Software Engineer III**, *Google*, Boulder, CO, USA
Field Tasking team

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* 27.3 (2020), pp. 265–300.

### Refereed Conference Publications

[6] **M. Velez**, P. Jamshidi, N. Siegmund, S. Apel, and C. Kästner. "On Debugging the Performance of Configurable Software Systems: Developer Needs and Tailored Tool Support". In *Proc. Int'l Conf. Software Engineering (ICSE)*. Pittsburh, PA, USA: ACM, May 2022. (26% acceptance rate).

[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, pp. 1072–1084. (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, pp. 497–508. (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

[1] **M. Velez**. "Debugging the Performance of Configurable Software Systems: A Human-Centered White-box Approach". PhD thesis. Carnegie Mellon University, 2021.

### 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. $1^{st}$ 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

| | |
|---|---|
| 2022 - Present | Hispanic Googler Network |
| 2018 - 2021 | Hispanic Googler Network (during internships) |
| 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 |