Miguel Velez

Ph.D. Student in Software Engineering

Carnegie Mellon University
School of Computer Science
Institute for Software Research
mvelezce [at] cs.cmu.edu
http://www.cs.cmu.edu/~mvelezce/
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". 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 (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. 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 - 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

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

References

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

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

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

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