Michele Tufano

Ph.D.

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Research Interests

My research interests include the application of Deep Learning techniques to Software Engineering tasks such as Automated Program Repair, Software Testing, Maintenance and Evolution. I also worked on Android Testing, Mining Software Repositories, Code Quality, and Software Building.
I currently work in the Natural Language Understanding team in Microsoft Bing.

Experience

2019–Present **Software Engineer**, *Microsoft*, Redmond, WA, USA.
■ Natural Language Understanding & Experience Team

2016–2019 **Research Assistant**, *The College of William and Mary*, Williamsburg, VA, USA.
W&M Advised by Prof. Denys Poshyvanyk

2018–2018 **Research Intern**, *Microsoft Research*, Redmond, WA, USA.
■ Advised by Kim Herzig and Hitesh Sajnani

2014–2016 **Teaching Assistant**, *The College of William and Mary*, Williamsburg, VA, USA.
○ CS 421 - Database Systems
○ CS 141 - Computational Problem Solving

Education

2014–2019 **Ph.D. in Computer Science**, *The College of William and Mary*,
Williamsburg, VA, USA. (*GPA: 3.75*).
Dissertation: **Learning Code Transformations via Neural Machine Translation**

2012–2014 **Master in Computer Science**, *University of Salerno*, Fisciano, Italy.
110/110 cum laude

2008–2012 **Bachelor in Computer Science**, *University of Salerno*, Fisciano, Italy.
110/110 cum laude

Master thesis

Title *An Empirical Study on Developer Related Factors Characterizing Fix-Inducing Commits*
Supervisors Andrea De Lucia, Gabriele Bavota, Rocco Oliveto

Languages

Spoken Italian (mother tongue), English (expert)
Programming Java (expert), Python, R, Matlab, JavaScript, SQL (good)

Google Scholar

Citations `https://scholar.google.com/citations?user=KmeqxSEAAAAJ&hl=en`

Awards

2019 - W&M	**William & Mary Award for Excellence in the Natural & Computational Sciences**
2018 - ICPC	**Best ERA Paper Award**, at the 26th IEEE/ACM International Conference on Program Comprehension (ICPC), *"Towards Just-In-Time Refactoring Recommenders"*.
2015 - ICSE	**ACM SIGSOFT Distinguished Paper Award**, at the 37th IEEE/ACM International Conference on Software Engineering (ICSE), *"When and Why Your Code Starts to Smell Bad"*.

Journal Articles

2019 - [J6]	Z. Chen, S. Kommrusch, **M. Tufano**, L.-N. Pouchet, D. Poshyvanyk, M. Monperrus, *"SEQUENCER: Sequence-to-Sequence Learning for End-to-End Program Repair"*, IEEE Transactions on Software Engineering (TSE 2019).
2019 - [J5]	**M. Tufano**, C. Watson, G. Bavota, M. Di Penta, M. White, D. Poshyvanyk, *"An Empirical Investigation into Learning Bug-Fixing Patches in the Wild via Neural Machine Translation"*, ACM Transactions on Software Engineering and Methodology (TOSEM 2019).
2017 - [J4]	M. Linares-Vásquez, C. Vendome, **M. Tufano**, and D. Poshyvanyk, *"How Developers Micro-Optimize Android Apps"*, Journal of Systems and Software (JSS 2017).
2017 - [J3]	**M. Tufano**, F. Palomba, G. Bavota, R. Oliveto, M. Di Penta, A. De Lucia, and D. Poshyvanyk, *"When and Why Your Code Starts to Smell Bad (and Whether the Smells Go Away)"*, IEEE Transactions on Software Engineering (TSE 2017).
2016 - [J2]	**M. Tufano**, F. Palomba, G. Bavota, M. Di Penta, R. Oliveto, A. De Lucia, and D. Poshyvanyk, *"There and Back Again: Can you Compile that Snapshot?"*, Journal of Software: Evolution and Process (JSEP 2016).
2016 - [J1]	**M. Tufano**, G. Bavota, D. Poshyvanyk, M. Di Penta, R. Oliveto, and A. De Lucia, *"An Empirical Study on Developer Related Factors Characterizing Fix-Inducing Commits"*, Journal of Software: Evolution and Process (JSEP 2016).

Conference Publications

2019 - [C15]	**M. Tufano**, C. Watson, G. Bavota, M. Di Penta, M. White, D. Poshyvanyk, *"Learning How to Mutate Source Code from Bug-Fixes"*, In Proceedings of the 35th IEEE International Conference on Software Maintenance and Evolution (ICSME 2019) - Cleveland, OH, USA, 2019, 12 pages. (23% acceptance rate).
2019 - [C14]	**M. Tufano**, J. Pantiuchina, C. Watson, G. Bavota, D. Poshyvanyk, *"On Learning Meaningful Code Changes via Neural Machine Translation"*, In Proceedings 41st ACM/IEEE International Conference on Software Engineering (ICSE 2019) - Montréal, QC, Canada, May 25-31, 2019, to appear 12 pages. (21% acceptance rate)
2019 - [C13]	**M. Tufano**, H. Sajnani, K. Herzig, *"Towards Predicting the Impact of Software Changes on Building Activities"*, In Proceedings 41st ACM/IEEE International Conference on Software Engineering (ICSE 2019), New Ideas and Emerging Results - Montréal, QC, Canada, May 25-31, 2019, to appear 4 pages. (31% acceptance rate)
2019 - [C12]	C. Bernal-Cárdenas, K. Moran, **M. Tufano**, Z. Liu, L. Nan, Z. Shi, and D. Poshyvanyk, *"Guigle: A GUI Search Engine for Android Apps"*, In Proceedings 41st ACM/IEEE International Conference on Software Engineering (ICSE 2019), Formal Research Tool Demonstration - Montréal, QC, Canada, May 25-31, 2019, to appear 4 pages. (47% acceptance rate)
2019 - [C11]	M. White, **M. Tufano**, M. Martinez, M. Monperrus, and D. Poshyvanyk, *"Sorting and Transforming Program Repair Ingredients via Deep Learning Code Similarities"*, In Proceedings 26th IEEE International Conference on Software Analysis, Evolution and Reengineering (SANER 2019) - angzhou, China, February 24-27, 2019, to appear 12 pages. (27% acceptance rate)

2018 - [C10] **M. Tufano**, C. Watson, G. Bavota, M. Di Penta, M. White, D. Poshyvanyk, *"An Empirical Investigation into Learning Bug-Fixing Patches in the Wild via Neural Machine Translation"*, In Proceedings of the 33rd IEEE/ACM International Conference on Automated Software Engineering (ASE 2018) - Montpellier, France, 2018, 6 pages. (21% acceptance rate).

2018 - [C9] **M. Tufano**, C. Watson, G. Bavota, M. Di Penta, M. White, D. Poshyvanyk, *"Deep Learning Similarities from Different Representations of Source Code"*, In Proceedings of the 15th IEEE/ACM International Conference on Mining Software Repositories (MSR 2018) - Gothenburg, Sweden, 2018, 12 pages. (33% acceptance rate).

2018 - [C8] J. Pantiuchina, G. Bavota, **M. Tufano**, D. Poshyvanyk, *"Towards Just-In-Time Refactoring Recommenders"*, In Proceedings of the 26th IEEE/ACM International Conference on Program Comprehension (ICPC 2018), Early Research Achievement Track - Gothenburg, Sweden, 2018, 4 pages. (47.8% acceptance rate).

2017 - [C7] K. Moran, **M. Tufano**, C. Bernal-Cardenas, M. Linares-Vasquez, G. Bavota, C. Vendome, M. Di Penta, D. Poshyvanyk, *"MDroid+: A Mutation Testing Framework for Android"*, In Proceedings of the 40th IEEE/ACM International Conference on Software Engineering (ICSE 2018) Research Demonstrations Track - Gothenburg, Sweden, 2018, 4 pages. (35% acceptance rate).

2017 - [C6] M. Linares-Vasquez, G. Bavota, **M. Tufano**, K. Moran, M. Di Penta, C. Vendome, C. Bernal-Cardenas, D. Poshyvanyk, *"Enabling Mutation Testing for Android Apps"*, In Proceedings of 11th Joint Meeting of the European Software Engineering Conference and the 22nd ACM SIGSOFT Symposium on the Foundations of Software Engineering (ESEC/FSE 2017) - Paderborn, Germany, 2017, 12 pages. (24% acceptance rate).

2016 - [C5] M. White, **M. Tufano**, C. Vendome, and D. Poshyvanyk, *"Deep Learning Code Fragments for Code Clone Detection"*, In Proceedings of the International Conference on Automated Software Engineering (ASE 2016) - Singapore, 2016, 12 pages (19% acceptance rate).

2016 - [C4] **M. Tufano**, F. Palomba, G. Bavota, R. Oliveto, M. Di Penta, A. De Lucia, and D. Poshyvanyk, *"An Empirical Investigation into the Nature of Test Smells"*, In Proceedings of the International Conference on Automated Software Engineering (ASE 2016) - Singapore, 2016, 12 pages (19% acceptance rate).

2015 - [C3] F. Palomba, D. Di Nucci, **M. Tufano**, G. Bavota, R. Oliveto, D. Poshyvanyk, A. De Lucia, *"Landfill: an Open Dataset of Code Smells with Public Evaluation"*, In Proceedings of the 12th IEEE/ACM Working Conference on Mining Software Repositories (MSR 2015) - Florence, Italy, 2015, 4 pages.

2015 - [C2] **M. Tufano**, F. Palomba, G. Bavota, R. Oliveto, M. Di Penta, A. De Lucia, and D. Poshyvanyk, *"When and Why Your Code Starts to Smell Bad"*, In Proceedings of the 37th International Conference on Software Engineering (ICSE 2015), Florence, Italy, 2015, 12 pages (18.5% acceptance rate).

2015 - [C1] F. Palomba, **M. Tufano**, G. Bavota, R. Oliveto, A. Marcus, D. Poshyvanyk, and A. De Lucia, *"Extract Package Refactoring in ARIES"*, In Proceedings of the 37th International Conference on Software Engineering (ICSE 2015) - Demonstrations Track, Florence, Italy, 2015, 4 pages (59% acceptance rate).

Full list of publications, data, tools, and source code available at: `https://tufanomichele.com`