

ANDREA STOCCO

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- research interests** My research mainly targets testing deep learning- and web-based software systems with empirical methods. My current interests involve misbehaviour prediction and transferability of testing results from simulated to real-world platforms for autonomous driving systems, and web test breakage detection and repair using computer vision techniques. Over the years, I also focused on solving problems related to many aspects of regression testing, such as test suite minimization, or improving the robustness and maintainability of end-to-end test suites for web applications.
- appointments** Postdoctoral Fellow, *Università della Svizzera italiana*, 2019–Present.
Postdoctoral Fellow, *University of British Columbia*, 2017–2018.
Visiting Scholar, *University of Nebraska-Lincoln*, Feb-Apr 2016.
- education** Ph.D, Computer Science, University of Genoa, Italy, 2017.
Dissertation: *Automatic page object generation to support E2E testing of web applications*.
M.Sc., Computer Science, University of Genoa, Italy, 2013.
Thesis: *Analysis and implementation of robust locators in the context of web testing*.
M.Sc., Cyber Security, Tallinn University of Technology, and Tartu University, Estonia, 2010/2011. *EU Erasmus exchange program*
B.Sc., Computer Science, University of Genoa, Italy, 2010.
- publications** *Conference articles*
- C17. G. Jahangirova, **A. Stocco**, P. Tonella. 2021.
“Quality Metrics and Oracles for Autonomous Vehicles Testing”. *Proceedings of 14th IEEE International Conference on Software Testing, Verification and Validation (ICST)*, Apr 2021. Core ranking: A.
- C16. F. Ricca, **A. Stocco**. 2021.
“Web Test Automation: Insights from the Grey Literature”. *Proceedings of 47th International Conference on Current Trends in Theory and Practice of Computer Science (SOFSEM)*, Jan 2021. Core ranking: B. **Best Paper Nominee**
- C15. **A. Stocco**, M. Weiss, M. Calzana, P. Tonella. 2020.
“Misbehaviour Prediction for Autonomous Driving Systems”. *Proceedings of 42th ACM SIGSOFT International Conference on Software Engineering (ICSE)*, May 2020. Acceptance rate: 21 % (129/617). Core ranking: A*.

- C14. N. Humbatova, G. Jahangirova, G. Bavota, V. Riccio, **A. Stocco**, P. Tonella. 2020. “[Taxonomy of Real Faults in Deep Learning Systems](#)”. *Proceedings of 42th ACM SIGSOFT International Conference on Software Engineering (ICSE)*, May 2020. Acceptance rate: 21 % (129/617). Core ranking: A*. **Best Artifact Award**
- C13. R. Yandrapally, **A. Stocco**, A. Mesbah. 2020. “[Near-Duplicate Detection in Web App Model Inference](#)”. *Proceedings of 42th ACM SIGSOFT International Conference on Software Engineering (ICSE)*, May 2020. ACM. Acceptance rate: 21 % (129/617). Core ranking: A*.
- C12. M. Biagiola, **A. Stocco**, F. Ricca, Paolo Tonella. “[Dependency-Aware Web Test Generation](#)”. *Proceedings of 13th IEEE International Conference on Software Testing, Verification and Validation (ICST)*, Apr 2019. IEEE. Acceptance rate: 27 % (27/114). Core ranking: A.
- C11. M. Biagiola, **A. Stocco**, Ali Mesbah, F. Ricca, Paolo Tonella. “[Web Test Dependency Detection](#)”. *Proceedings of 27th ACM Joint European Software Engineering Conference and Symposium on the Foundations of Software Engineering (ESEC/FSE)*, Aug 2019. ACM. Acceptance rate: 24% (74/303). Core ranking: A*.
- C10. M. Biagiola, **A. Stocco**, F. Ricca, Paolo Tonella. “[Diversity-Based Web Test Generation](#)”. *Proceedings of 27th ACM Joint European Software Engineering Conference and Symposium on the Foundations of Software Engineering (ESEC/FSE)*, Aug 2019. ACM. Acceptance rate: 24% (74/303). Core ranking: A*.
- C9. P. Gyimesi, Béla Vancsics, **A. Stocco**, Davood Mazinanian, Árpád Beszédés, Rudolf Ferenc, Ali Mesbah. “[BugsJS: a Benchmark of JavaScript Bugs](#)”. *Proceedings of 12th IEEE International Conference on Software Testing, Verification and Validation (ICST)*, Apr 2019. IEEE. Acceptance rate: 28 % (31/110). Core ranking: A.
- C8. **A. Stocco**, R. Yandrapally, A. Mesbah. 2018. “[Visual Web Test Repair](#)”. *Proceedings of 26th ACM Joint European Software Engineering Conference and Symposium on the Foundations of Software Engineering (ESEC/FSE)*, Nov 2018. ACM. Acceptance rate: 19% (55/289) . Core ranking: A*.
- C7. A. Vahabzadeh, **A. Stocco**, A. Mesbah. 2018. “[Fine-Grained Test Minimization](#)”. *Proceedings of 40th ACM SIGSOFT International Conference on Software Engineering (ICSE)*, May 2018. ACM. Acceptance rate: 20 % (105/502). Core ranking: A*.
- C6. M. Hammoudi, G. Rothermel, **A. Stocco**. 2016. “[WATERFALL: An Incremental Approach for Repairing Record-Replay Tests of Web Applications](#)”. *Proceedings of 24th ACM SIGSOFT International Symposium on the Foundations of Software Engineering (FSE)*, Nov 2016. ACM. Acceptance rate: 27 % (74/273). Core ranking: A*.

- C5. **A. Stocco**, M. Leotta, F. Ricca, P. Tonella. 2016.
 “Clustering-Aided Page Object Generation for Web Testing”. *Proceedings of 16th International Conference on Web Engineering (ICWE)*. Jun 2016. Lecture Notes in Computer Science, vol 9671, Springer. Acceptance rate: 21 % (19/90). Core ranking: **B. Best Student Paper Award**.
- C4. M. Leotta, **A. Stocco**, F. Ricca, P. Tonella. 2015.
 “Using Multi-Locators to Increase the Robustness of Web Test Cases”. *Proceedings of 8th International Conference on Software Testing, Verification and Validation (ICST)*, Apr 2015. IEEE. Acceptance rate: 24 % (32/132). Core ranking: A.
- C3. M. Leotta, **A. Stocco**, F. Ricca, P. Tonella. 2015.
 “Automated Migration of DOM-based to Visual Web Tests”. *Proceedings of 30th ACM/SIGAPP Symposium on Applied Computing (SAC)*, Apr 2015. ACM. Acceptance rate: 24 % (291/1211). Core ranking: C.
- C2. **A. Stocco**, M. Leotta, F. Ricca, P. Tonella. 2014.
 “PESTO: A Tool for Migrating DOM-based to Visual Web Tests”. *Proceedings of 14th International Working Conference on Source Code Analysis and Manipulation (SCAM)*, Sep 2014. IEEE. Acceptance rate: 56 % (10/18). Core ranking: C.
- C1. F. Ricca, M. Leotta, **A. Stocco**, D. Clerissi, P. Tonella. 2013.
 “Web Testware Evolution”. *Proceedings of 15th International Symposium on Web Systems Evolution (WSE)*, Sep 2013. IEEE. *Invited paper*. Core ranking: C.

Journal articles

- J7. **A. Stocco**, P. Tonella.
 “Confidence-driven Weighted Retraining for Predicting Safety-Critical Failures in Autonomous Driving Systems”. *Journal of Software: Evolution and Process (JSEP)*. Wiley, Sep 2021.
- J6. M. Bajammal, **A. Stocco**, D. Mazinianian, A. Mesbah.
 “A Survey on the Use of Computer Vision to Improve Software Engineering Tasks”. *IEEE Transactions on Software Engineering (TSE)*. IEEE, Oct 2021.
- J5. P. Gyimesi, B. Vancsics, **A. Stocco**, D. Mazinianian, A. Beszédes, R. Ferenc, A. Mesbah.
 “BugsJS: a Benchmark and Taxonomy of JavaScript bugs”. *Software Testing, Verification And Reliability (STVR)*. Wiley, Oct 2020.
- J4. F. Ricca, M. Leotta, **A. Stocco**.
 “Three Open Problems in the Context of E2E Web Testing and a Vision: NEONATE”. *Advances in Computers*. Elsevier.
- J3. M. Leotta, **A. Stocco**, F. Ricca, P. Tonella.
 “PESTO: Automated Migration of DOM-based Web Tests towards the Visual Approach”. *Software Testing, Verification And Reliability (STVR)*. Wiley, Mar 2018.

- J2. **A. Stocco**, M. Leotta, F. Ricca, P. Tonella.
 “APOGEN: Automatic Page Object Generator for Web Testing”. *Software Quality Journal (SQJ)*, 25(3), Springer, Sep 2017.
- J1. M. Leotta, **A. Stocco**, F. Ricca, P. Tonella.
 “ROBULA+: An Algorithm for Generating Robust XPath Locators for Web Testing”. *Journal of Software: Evolution and Process (JSEP)*, 28(3), Wiley, Mar 2016.
Invited J1 track – ICSME 2016.

Workshop, Demo & Poster articles

- W9. F. Ricca, A. Marchetto, **A. Stocco**. 2021.
 “AI-based Test Automation: A Grey Literature Analysis”. *Proceedings of 4th IEEE International Conference on Software Testing, Verification and Validation Workshops 2021 (ICSTW)*, Apr 2021. **Best Presentation Award**
- W8. **A. Stocco**, P. Tonella. 2020.
 “Towards Anomaly Detectors that Learn Continuously”. *Proceedings of 31st International Symposium on Software Reliability Engineering Workshops (ISSREW)*. Oct 2020.
- W7. **A. Stocco**.
 “How Artificial Intelligence Can Improve Web Development and Testing”. *Companion of the 3rd International Conference on Art, Science, and Engineering of Programming (ProWeb - Invited Talk)*, Apr 2019. ACM.
- W6. Béla Vancsics, Péter Gyimesi, **A. Stocco**, Davood Mazinianian, Árpád Beszédes, Rudolf Ferenc, Ali Mesbah.
 “Poster: Supporting JavaScript Experimentation with BugsJS”. *Proceedings of 12th IEEE International Conference on Software Testing, Verification and Validation (ICST - Poster Track)*, Apr 2019. IEEE. Core ranking: A.
- W5. **A. Stocco**, R. Yandrapally, A. Mesbah. 2018.
 “VISTA: Web Test Repair using Computer Vision”. *Proceedings of 26th ACM Joint European Software Engineering Conference and Symposium on the Foundations of Software Engineering (ESEC/FSE - Demonstration Track)*, Nov 2018. ACM. Acceptance rate: 39% (14/36) . Core ranking: A*.
- W4. **A. Stocco**, M. Leotta, F. Ricca, P. Tonella. 2016.
 “Automatic Page Object Generation with APOGEN”. *Proceedings of 16th International Conference on Web Engineering (ICWE - Demo Track)*. Jun 2016. Lecture Notes in Computer Science, vol 9671, Springer. Acceptance rate: 61 % (11/18).
- W3. **A. Stocco**, M. Leotta, F. Ricca, P. Tonella. 2015.
 “Why Creating Web Page Objects Manually If It Can Be Done Automatically?”. *Proceedings of 10th IEEE/ACM International Workshop on Automation of Software Test (AST)*, May 2015, IEEE.

- W2. M. Leotta, **A. Stocco**, F. Ricca, P. Tonella. 2015.
 “Meta-Heuristic Generation of Robust XPath Locators for Web Testing”.
Proceedings of 8th International Workshop on Search-Based Software Testing (SBST),
 May 2015, ACM. Acceptance rate: 62 % (8/13).
- W1. M. Leotta, **A. Stocco**, F. Ricca, P. Tonella. 2014.
 “Reducing Web Test Cases Aging by means of Robust XPath Locators”.
Proceedings of 25th International Symposium on Software Reliability Engineering Work-
shops (ISSREW), Nov 2014, IEEE.

grants & awards

Best Presentation Award at ICSTW 2021.

Best Paper Nominee at SOFSEM 2021.

Best Artifact Award at ICSE 2020.

Best Student Paper Award at ICWE 2016.

ACM SIGSOFT CAPS travel award to attend FSE 2016.

ACM SIGSOFT Travel Grant travel award to attend SCAM 2014.

Erasmus Scholarship to attend courses at Tallinn University of Technology and Tartu University, 2010/11.

service to the profession

PC Chair (Workshop): DeepTest 2021, ProWeb 2021, DeepTest 2020, ProWeb 2020

PC Member (Conferences): ICST 2022, ASE 2022 (Review Process Co-Chair), ESEC/FSE 2021, ICST 2021, ISSRE 2021, ICWE 2021, ICSE 2021 (SRC ACM Student Research Competition), MobileSoft 2021 (Vision and Tool Demos Track), GAUSS 2021, SSBSE 2021 (Replications and Negative Results Track), ICST 2020, ICWE 2020, ICWE 2019, SANER 2019 (ERA)

PC Member (Workshops): ENIAC 2020, ProWeb 2019

Reviewer (Journals): IEEE Transactions on Software Engineering, Empirical Software Engineering, ACM Transactions on Software Engineering and Methodology, ACM Transactions on the Web, IEEE Transactions on Services Computing, Journal of Systems and Software, Software Testing, Verification & Reliability, Software Quality Journal, Information and Software Technology, Journal of Automotive Software Engineering, IET Software

External Reviewer (Conferences): ICSE 2018, ASE 2017, ESEC/FSE 2017, ICSE 2017, ICST 2017, ISSTA 2017, SANER 2016, ESEM 2015, ESEM 2014, ICPC 2014, ICSME 2014, ICST 2014, SCAM 2014

teaching experience

Guest Lectures

EECE 514: Software Verification and Testing course. “Automatic techniques for E2E testing of web applications” Fall 2018, UBC.

CPEN400A: Building Modern Web Applications course. “Approaches and tools for Automated E2E testing of web applications” Fall 2018, UBC.

EECE 514: Software Verification and Testing. “Approaches and tools for Automated E2E testing of web applications” Fall 2016, UBC.

Teaching Assistance

80305: Software Engineering. Fall 2016, University of Genoa.

80305: Software Engineering. Fall 2015, University of Genoa.

80299: Introduction to Computer Programming. Fall 2014, University of Genoa.

57279: Computer Science for Biology. Fall 2014, University of Genoa.

mentorship
experience

2021. Brian Pulfer - graduate student in AI at USI, Switzerland. Thesis title: “From Simulated to Real Test Environments for Self Driving Cars”. Grade: 9.5/10.

2021. Das Shubhayu - graduate student in AI at USI, Switzerland. Thesis title: “Devising techniques for the automated repair of trained deep neural networks”. Grade: 9.5/10.

2019. Matteo Calzana - graduate student in CS at USI, Switzerland. Thesis title: “Misbehaviour Prediction in Autonomous Vehicle using Autoencoders”. Grade: 10/10.
Awarded with the best MSc thesis and the Swissengineering Ticino Award (1,000 CHF)

2019. Mathias Henriksen - graduate student in CS at Technical University of Denmark, Denmark. Thesis title: “Deriving Unique Locators for Web Elements”.

2018-2019. Matteo Biagiola - PhD at FBK Trento, Italy.

2017-2019. Rahulkrishna Yandrapally - PhD candidate at UBC, Canada.

2017-2018. Lorenzo De Bernardini - undergraduate student in CS at UBC, Canada.

keynotes &
conference
presentations

“E2E Web Test Automation: A(I) look into the future with an eye to the past”. **Guest Lecture** at Web Engineering at TU Wien, Austria. Jul 2021 (virtual).

“Black-box Confidence Estimation for Misbehavior Prediction in Autonomous Driving Systems”. **Invited Talk** at the 61th Crest Open Workshop, University College London (UCL), 2019. Oct 2019, London, United Kingdom.

“Black-box Confidence Estimation for Misbehavior Prediction in Autonomous Driving Systems”. University of Szeged, 2019. Oct 2019, Szeged, Hungary.

“How Artificial Intelligence Can Improve Web Development and Testing”. **Keynote** at Proweb 2019. Apr 2019, Genova, Italy.

“BugsJS: A Benchmark of JavaScript Bugs.” Presented at *ICST '19*, Xi'an, China. April 2019.

“Visual Web Test Repair.” Presented at *ESEC/FSE '18*, Lake Buena Vista, FL, USA. November 2018.

“VISTA: Web Test Repair using Computer Vision.” Presented at *ESEC/FSE '18*, Lake Buena Vista, FL, USA. November 2018.

“Fine-Grained Test Minimization.” Presented at *ICSE '18*, Gothenburg, Sweden. May 2018.

- “Web Canvas Testing through Visual Inference.” Presented at *ICST '18*, Västerås, Sweden. April 2018.
- “Fine-Grained Test Minimization.” Presented at [Google Journal Club](#). March 2018.
- “Clustering-Aided Page Object Generation for Web Testing.” Presented at *ICWE '16*, Lugano, Switzerland. June 2016.
- “Why Creating Web Page Objects Manually If It Can Be Done Automatically?.” Presented at *AST '15*, Florence, Italy. May 2015.
- “Reducing Web Test Cases Aging by means of Robust XPath Locators.” Presented at *ISSREW '14*, Naples, Italy. May 2014.
- “PESTO: A Tool for Migrating DOM-based to Visual Web Tests.” Presented at *SCAM '14*, Victoria, BC, Canada. September 2014.