

Mattia Fazzini

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RESEARCH INTERESTS

Software Engineering, Software Testing, Software Maintenance

My research aims to improve the overall quality of software. The central theme of my research is the development of techniques for software testing and maintenance.

EMPLOYMENT

| | |
|--------------|---|
| 2019-Present | <i>Assistant Professor</i> University of Minnesota Department of Computer Science & Engineering |
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EDUCATION

| | |
|-----------|--|
| 2013-2019 | <i>Ph.D. in Computer Science</i> Georgia Institute of Technology Advisor: Alessandro Orso |
| 2010-2012 | <i>M.S. in Engineering of Computing Systems</i> Politecnico di Milano |
| 2010-2012 | <i>M.S. in Computer Science</i> University of Illinois at Chicago Double degree program with Politecnico di Milano |
| 2010-2012 | <i>M.S. in Computer Systems Engineering</i> Politecnico di Torino Double degree program with Politecnico di Milano |
| 2006-2009 | <i>B.S. in Information Engineering</i> University of Ferrara |

PUBLICATIONS

Journal Publications

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|---------------|---|
| TOSEM 2025 | <i>Characterizing Installation- and Run-Time Compatibility Issues in Android Benign Apps and Malware</i> J. Guo, X. Fu, L. Li, T. Zhang, M. Fazzini, H. Cai ACM Transactions on Software Engineering and Methodology (TOSEM), Journal Extension, 2025 43 pages |
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TOSEM
2023

Automatically Detecting Incompatible Android APIs
P. Liu, Y. Zhao, M. Fazzini, H. Cai, J. Grundy, L. Li
ACM Transactions on Software Engineering and Methodology (TOSEM), Journal Extension, 2023
33 pages

TSE
2023

Enhancing Mobile App Bug Reporting via Real-time Understanding of Reproduction Steps
M. Fazzini, K. Moran, C. Bernal-Cardenas, T. Wendland, A. Orso, D. Poshyvanyk
IEEE Transactions on Software Engineering (TSE), Journal First, 2023
26 pages

Conference Publications

MOBILESoft
2025

Toward Understanding and Detecting Battery Saver Issues in Android Apps
W. Siemers, L. Cruz, and M. Fazzini
Proceedings of the 12th International Conference on Mobile Software Engineering and Systems (MOBILESoft), 2025
12 pages

MSR
2024

Automating GUI-based Test Oracles for Mobile Apps
K. Baral, J. Johnson, J. Mahmud, S. Salma, M. Fazzini, J. Rubin, J. Offutt and K. Moran
Proceedings of the 21st International Conference on Mining Software Repositories (MSR), 2024
13 pages, 29% acceptance rate

ICST
2024

Automatically Removing Unnecessary Stubbings from Test Suites
M. Li and M. Fazzini
Proceedings of the 17th IEEE International Conference on Software Testing, Verification and Validation (ICST), 2024
12 pages, 25% acceptance rate
🏆 *This paper won the IEEE TCSE Distinguished Paper Award*

INTUITEST
2023

Action-Based Test Carving for Android Apps
A. Gambi, H. Gouni, D. Berreiter, V. Tymofyeyev, and M. Fazzini
International Workshop on User Interface Test Automation and Testing Techniques for Event Based Software (INTUITESTBEDS), 2023
10 pages

ISSTA
2022

Automatically Detecting API-induced Compatibility Issues in Android Apps: A Comparative Analysis
P. Liu, Y. Zhao, H. Cai, M. Fazzini, J. Grundy, and L. Li
Proceeding of the 31st International Symposium on Software Testing and Analysis (ISSTA), 2022
12 pages, 24.4% acceptance rate

MSR
2022

Do Customized Android Frameworks Keep Pace with Android?
P. Liu, M. Fazzini, J. Grundy, and L. Li
Proceedings of the 19th International Conference on Mining Software Repositories (MSR), 2022
12 pages, 34% acceptance rate

MOBILESoft
2022

Characterizing Human Aspects in Reviews of COVID-19 Apps
M. Fazzini, H. Khalajzadeh, O. Haggag, Z. Li, H. Obie, C. Arora, W. Hussain, and J. Grundy
Proceeding of the 9th IEEE/ACM International Conference on Mobile Software Engineering and Systems (MOBILESoft), 2022
12 pages, 40.9% acceptance rate
🏆 *This paper won the ACM Distinguished Paper Award*

SANER
2022

An Empirical Investigation into the Reproduction of Bug Reports for Android Apps
J. Johnson, J. Mahmud, T. Wendland, K. Moran, J. Rubin, and M. Fazzini
Proceedings of the 29th edition of the IEEE International Conference on Software Analysis, Evolution and Reengineering (SANER), 2022
12 pages, 24.1% acceptance rate

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| ICSE 2022 | <i>Use of Test Doubles in Android Testing: An In-Depth Investigation</i> M. Fazzini, C. Choi, J. M. Copia, G. Lee, Y. Kakehi, A. Gorla, and A. Orso Proceedings of the 44th International Conference on Software Engineering (ICSE), 2022 13 pages, 26% acceptance rate |
| ICSE SEIP 2021 | <i>Identifying and Characterizing Silently-Evolved Methods in the Android API</i> P. Liu, L. Li, Y. Yan, M. Fazzini, and J. Grundy. Proceedings of the 43rd International Conference on Software Engineering (ICSE), Software Engineering in Practice (SEIP) Track, 2021. 10 pages, 34% acceptance rate |
| ISSTA 2019 | <i>Automated API-usage update for Android apps</i> M. Fazzini, Q. Xin, and A. Orso Proceedings of the 28th ACM SIGSOFT International Symposium on Software Testing and Analysis (ISSTA), 2019 12 pages, 22.5% acceptance rate |
| USENIX Security 2018 | <i>Enabling Refinable Cross-Host Attack Investigation with Efficient Data Flow Tagging and Tracking</i> Y. Ji, S. Lee, M. Fazzini, J. Allen, E. Downing, T. Kim, A. Orso, and W. Lee Proceedings of the 27th USENIX Conference on Security Symposium (USENIX Security), 2018 18 pages, 19.1% acceptance rate |
| ISSTA 2018 | <i>Automatically Translating Bug Reports into Test Cases for Mobile Apps</i> M. Fazzini, M. Prammer, M. d'Amorim, and A. Orso Proceedings of the 27th ACM SIGSOFT International Symposium on Software Testing and Analysis (ISSTA), 2018 12 pages, 23.5% acceptance rate |
| CCS 2017 | <i>RAIN: Refinable Attack Investigation with On-demand Inter-Process Information Flow Tracking</i> Y. Ji, S. Lee, E. Downing, W. Wang, M. Fazzini, T. Kim, A. Orso, and W. Lee Proceedings of the 2017 ACM SIGSAC Conference on Computer and Communications Security (CCS), 2017 14 pages, 18.1% acceptance rate |
| ASE 2017 | <i>Automated Cross-Platform Inconsistency Detection for Mobile Apps</i> M. Fazzini and A. Orso Proceedings of the 32nd IEEE/ACM International Conference on Automated Software Engineering (ASE), 2017 11 pages, 24% acceptance rate |
| ICST 2017 | <i>Barista: A Technique for Recording, Encoding, and Running Platform Independent Android Tests</i> M. Fazzini, E. N. D. A. Freitas, S. Roy Choudhary, and A. Orso Proceedings of the 2017 IEEE International Conference on Software Testing, Verification and Validation (ICST), 2017 12 pages, 26.7% acceptance rate |
| ICSE 2015 | <i>AutoCSP: Automatically Retrofitting CSP to Web Applications</i> M. Fazzini, P. Saxena, and A. Orso Proceedings of the 37th International Conference on Software Engineering (ICSE), 2015 11 pages, 18.5% acceptance rate |
| ISSTA 2012 | <i>ViewPoints: Differential String Analysis for Discovering Client- and Server-Side Input Validation Inconsistencies</i> M. Alkhalaf, S. Roy Choudhary, M. Fazzini, T. Bultan, A. Orso, and C. Kruegel Proceedings of the 2012 International Symposium on Software Testing and Analysis (ISSTA), 2012 11 pages, 26% acceptance rate |

Short Publications

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| MSR Data Showcase 2025 | <i>DataTD: A Dataset of Java Projects Including Test Doubles</i> M. Li and M. Fazzini Proceedings of the 22nd International Conference on Mining Software Repositories (MSR), Data and Tool Showcase, 2025 4 pages, 58% acceptance rate |
| ASE Tool Demos 2024 | <i>ARUS: A Tool for Automatically Removing Unnecessary Stubbings from Test Suites</i> M. Li and M. Fazzini Proceedings of the 39th IEEE/ACM International Conference on Automated Software Engineering (ASE), Tool Demo, 2024 4 pages, 51% acceptance rate |
| ICSME Tool Demos 2023 | <i>Artisan: An Action-Based Test Carving Tool for Android Apps</i> A. Gambi, M. Li, and M. Fazzini IEEE International Conference on Software Maintenance and Evolution (ICSME), Tool Demo, 2023 5 pages, 61.1% acceptance rate |
| MSR Data Showcase 2021 | <i>AndroR2: A Dataset of Manually-Reproduced Bug Reports for Android apps</i> T. Wendland, J. Sun, J. Mahmud, S. M. H. Mansur, S. Huang, K. Moran, J. Rubin, and M. Fazzini Proceedings of the 18th Conference on Mining Software Repositories (MSR), Data Showcase, 2021 4 pages |
| ASE NIER 2020 | <i>A Framework for Automated Test Mocking of Mobile Apps</i> M. Fazzini, A. Gorla, and A. Orso. Proceedings of the 35th IEEE/ACM International Conference on Automated Software Engineering (ASE), New Ideas and Emerging Results (NIER) track, 2020 4 pages |
| ASE LBR 2020 | <i>Managing App Testing Device Clouds: Issues and Opportunities</i> M. Fazzini and A. Orso. Proceedings of the 35th IEEE/ACM International Conference on Automated Software Engineering (ASE), Late Breaking Results (LBR), 2020 2 pages, 60% acceptance rate |
| MOBILESoft Tool Demos 2020 | <i>APIMigrator: An API-Usage Migration Tool for Android Apps</i> M. Fazzini, Q. Xin, and A. Orso. Proceedings of the 6th International Conference on Mobile Software Engineering and Systems (MOBILESoft), Tool Demos and Mobile Apps track, 2020 4 pages, 71% acceptance rate |
| MOBILESoft Short Paper 2019 | <i>Identifying Features of Android Apps from Execution Traces</i> Q. Xin, F. Behrang, M. Fazzini, and A. Orso Proceedings of the 6th International Conference on Mobile Software Engineering and Systems (MOBILESoft), Short Paper, 2019 5 pages |
| FSE Doctoral Symposium 2018 | <i>Automated Support for Mobile Application Testing and Maintenance</i> M. Fazzini Proceedings of the 12th Joint European Software Engineering Conference and the Symposium on the Foundations of Software Engineering (ESEC/FSE), Doctoral Symposium, 2018 4 pages |

Other Publications

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| SBFT SDC Competition 2025 | <i>SBFT Tool Competition 2025 - CPS-SDC Regression Testing Track</i> C. Birchler, S. Klikovits, M. Fazzini, and S. Panichella Proceedings of the 18th International Workshop on Search-Based and Fuzz Testing, SDC Competition Track, 2025 4 pages |
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| ICST Tool Competition 2025 | <i>ICST Tool Competition 2025 – Self-Driving Car Testing Track</i> C. Birchler, S. Klikovits, M. Fazzini, and S. Panichella Proceedings of the 18th International Conference on Software Testing, Verification and Validation (ICST), Tool Competition - Self-Driving Car Testing Track, 2025 4 pages |
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AWARDS

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| 2024 | <i>IEEE TCSE Distinguished Paper Award</i> International Conference on Software Testing, Verification and Validation (ICST) |
| 2023 | <i>Distinguished Program Committee Member Award</i> International Conference on Automated Software Engineering (ASE) |
| 2022 | <i>ACM Distinguished Paper Award</i> International Conference on Mobile Software Engineering and Systems (MOBILESoft) |

GRANTS

Travel: NSF Student Travel Grant for the 2023 IEEE/ACM International Conference on Software Engineering (ICSE)
National Science Foundation
PI: M. Fazzini
Awarded in February 2023, \$33,690

Moka: Improving App Testing with Automated Mocking
Facebook, Inc.
PI: M. Fazzini
Co-PIs: A. Gorla (IMDEA Software Institute), A. Orso (Georgia Institute of Technology)
Awarded in October 2019, \$49,838

TEACHING

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|-------------|---|
| Fall 2024 | <i>CSCI 3081W Program Design and Development (Section 020)</i> Undergraduate course (117 students) |
| Fall 2024 | <i>CSCI 3081W Program Design and Development (Section 001)</i> Undergraduate course (171 students) |
| Spring 2024 | <i>CSCI 5802 Software Engineering II</i> Undergraduate and graduate course (62 students) |
| Fall 2023 | <i>CSCI 8980 Automated Software Engineering</i> Graduate course (17 students) |
| Spring 2022 | <i>CSCI 5802 Software Engineering II</i> Undergraduate and graduate course (67 students) |
| Fall 2021 | <i>CSCI 3081W Program Design and Development</i> Undergraduate course (179 students) |
| Spring 2021 | <i>CSCI 5802 Software Engineering II</i> Undergraduate and graduate course (63 students) |
| Fall 2020 | <i>CSCI 3081W Program Design and Development</i> Undergraduate course (148 students) |
| Spring 2020 | <i>CSCI 8980 Automated Software Engineering</i> Graduate course (11 students) |

INVITED TALKS AND PANELS

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| Keynote | MOBILESoft 2024, <i>Automated Testing and Maintenance of Mobile Applications: Are We There Yet?</i> |
| Talk | Università della Svizzera Italiana 2023, <i>Automated Support for Improving Software Quality of Mobile Apps Before and After Release</i> |
| Panel | MOBILESoft 2020, <i>Future Challenges in Mobile Software Engineering</i> |
| Talk | A-Mobile 2019, <i>Automated Support for Testing and Maintenance of Mobile Applications</i> |
| Talk | Facebook 2019, <i>Moka: Improving App Testing with Automated Mocking</i> |
| Talk | Politecnico di Milano 2019, <i>Automated Support for Testing and Maintenance of Mobile Applications</i> |
| Talk | Purdue University 2018, <i>THEIA: Tagging and Tracking of Multi-Level Host Event for Transparent Computing and Information Assurance</i> |

PROFESSIONAL ACTIVITIES

Conference Organization

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|------|---|
| 2025 | <i>SDC Competition Co-chair, SBFT</i> |
| 2025 | <i>Tool Competition Co-chair, ICST</i> |
| 2024 | <i>SRC Co-chair, ICSE ACM Student Research Competition (SRC)</i> |
| 2023 | <i>General Co-chair, MOBILESoft</i> |
| 2023 | <i>SCORE Co-chair, ICSE Student Contest on Software Engineering (SCORE)</i> |
| 2022 | <i>Publicity Chair, ISSTA</i> |
| 2022 | <i>SRC Co-chair, MOBILESoft ACM Student Research Competition (SRC)</i> |
| 2021 | <i>PC Co-chair, MOBILESoft</i> |
| 2021 | <i>Diversity Co-chair, ASE</i> |
| 2020 | <i>Student Volunteer Co-chair, ISSTA</i> |

Conference Reviewing

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|------|---|
| 2025 | <i>PC Member, ISSTA</i> |
| 2025 | <i>PC Member, FSE</i> |
| 2025 | <i>PC Member, ICSE</i> |
| 2024 | <i>PC Member, ASE</i> |
| 2024 | <i>PC Member, ISSTA</i> |
| 2024 | <i>Doctoral Symposium PC Member, ICST Doctoral Symposium</i> |
| 2024 | <i>PC Member, MOBILESoft</i> |
| 2023 | <i>PC Member, ASE</i> |
| 2023 | <i>Tool Demos PC Member, ISSTA Tool Demos</i> |
| 2022 | <i>PC Member, ASE</i> |
| 2022 | <i>Tool Demos PC Member, ISSTA Tool Demos</i> |
| 2022 | <i>ERA PC Member, SANER Early Research Achievements (ERA)</i> |
| 2022 | <i>PC Member, ICST</i> |
| 2021 | <i>PC Member, A-Mobile</i> |
| 2021 | <i>PC Member, A-Test</i> |
| 2021 | <i>PC Member, ASE</i> |
| 2021 | <i>Tool Demos PC Member, ASE Tool Demos</i> |
| 2021 | <i>PC Member, ICST</i> |
| 2020 | <i>PC Member, LANGETI</i> |
| 2020 | <i>Tool Demos PC Member, ASE Tool Demos</i> |
| 2020 | <i>Tool Demos PC Member, ISSTA Tool Demos</i> |
| 2020 | <i>Vision PC Member, MOBILESoft Vision Track</i> |
| 2020 | <i>Posters PC Member, ICST Posters Track</i> |
| 2020 | <i>AE PC Member, ISSTA Artifact Evaluation</i> |

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| 2019 | <i>AE PC Member, ISSTA Artifact Evaluation</i> |
| 2019 | <i>PC Member, ESSoS</i> |
| 2019 | <i>Subreviewer, ICISS</i> |

Journal Reviewing

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|------|---|
| 2025 | <i>Reviewer, IEEE Transactions on Software Engineering (TSE)</i> |
| 2023 | <i>Reviewer×2, IEEE Transactions on Software Engineering (TSE)</i> |
| 2023 | <i>Reviewer, Empirical Software Engineering (EMSE)</i> |
| 2022 | <i>Reviewer, Journal of Systems and Software (JSS)</i> |
| 2022 | <i>Reviewer×2, IEEE Transactions on Software Engineering (TSE)</i> |
| 2022 | <i>Reviewer, ACM Transactions on Software Engineering Methodology (TOSEM)</i> |
| 2021 | <i>Reviewer×2, ACM Transactions on Software Engineering Methodology (TOSEM)</i> |
| 2021 | <i>Reviewer×4, Empirical Software Engineering (EMSE)</i> |
| 2021 | <i>Reviewer, Automated Software Engineering Journal (AUSE)</i> |
| 2020 | <i>Reviewer, Empirical Software Engineering (EMSE)</i> |
| 2020 | <i>Reviewer, Automated Software Engineering Journal (AUSE)</i> |
| 2020 | <i>Reviewer, Journal of Systems and Software (JSS)</i> |
| 2020 | <i>Reviewer×3, IEEE Transactions on Software Engineering (TSE)</i> |
| 2019 | <i>Reviewer, Automated Software Engineering Journal (AUSE)</i> |
| 2018 | <i>Reviewer, Journal of Systems and Software (JSS)</i> |
| 2016 | <i>Reviewer, Transactions on Privacy and Security (TOPS)</i> |

Funding Reviewing

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|------|--|
| 2024 | <i>Reviewer, National Science Foundation (NSF)</i> |
| 2022 | <i>Reviewer, National Science Foundation (NSF)</i> |
| 2021 | <i>Reviewer, Department of Energy (DOE)</i> |

MENTORING AND ADVISING

Faculty Members

| | |
|-------------------|---|
| Fall 2024-Present | Shonal Gangopadhyay (Teaching Specialist) |
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Ph.D. Students

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|---------------------|--------------|
| Fall 2024-Present | Jingjing Wu |
| Fall 2021-Present | Mengzhen Li |
| Spring 2021-Present | Jack Johnson |

M.S. Students

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|-----------------------|----------------|
| Fall 2021-Spring 2022 | Jared Lim |
| Fall 2020-Fall 2021 | Tyler Wendland |
| Fall 2020-Spring 2021 | Jia Zhang |
| Fall 2020-Spring 2021 | Chase Choi |
| Spring 2020-Fall 2020 | Yichun Yan |
| Fall 2019 | Pranay Pratil |

Undergraduate Students

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|-----------------------|--------------------|
| Spring 2025-Present | Chaitanya Laddha |
| Fall 2024-Present | Hovhannes Muradyan |
| Fall 2020-Spring 2022 | Hemant Gouni |
| Fall 2021-Spring 2022 | Jack Lee |
| Fall 2021 | David Ha |
| Fall 2021 | Charlie Nazarian |

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| Fall 2020-Spring 2021 | Gabriel Lee |
| Fall 2020-Spring 2021 | Andrew Lee |
| Fall 2020 | Emily Steinebrey |
| Spring 2020 | Muskan Bagati |
| Fall 2019-Fall 2020 | Tyler Wendland |

THESIS COMMITTEES

Ph.D. Students

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|------|--|
| 2023 | Ali Mohebbi, <i>Semantic Matching for Migrating Tests Across Similar Interactive Applications</i> , Università della Svizzera Italiana |
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M.S. Students

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| 2024 | Wander Siemers, <i>Characterizing and Detecting Battery Saver Bugs in Android Applications</i> , Delft University |
| 2024 | Youssef Zahar, <i>DomainSweep: Input Domain Driven Falsification of Cyber-Physical Systems</i> , University of Minnesota |

Undergraduate Students

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|------|---|
| 2021 | David Ibarra, <i>SkyPortal: Using Statistical and Machine Learning Methods to Analyze Light Curves of Kilonovae</i> , University of Minnesota, 2021 |
| 2021 | David Ha, <i>Supplementing Bug Reports using Matched App Reviews</i> , University of Minnesota, 2021 |
| 2021 | Gabriel Lee, <i>A Study on The Evolution of Test Doubles in Mobile Applications</i> , University of Minnesota |
| 2020 | Abigail Herzog, <i>AI and Bias in Healthcare: A Survey and Critical Review</i> , University of Minnesota |
| 2020 | Emily Steinebrey, <i>Local Unit Testing of Mobile Applications: An Empirical Study of the Roboelectric Framework</i> , University of Minnesota |
| 2020 | Tyler Wendland, <i>Using N-gram Sequence Modeling to Improve Bug Reporting in the Domain of Mobile Applications</i> , University of Minnesota |

PROFESSIONAL AND RESEARCH EXPERIENCE

| | |
|-------------|---|
| Summer 2014 | <i>University of California, Berkeley, USA</i> Research Internship Mentor: Dawn Song |
| Summer 2013 | <i>National University of Singapore, Singapore</i> Research Internship Mentors: Abhik Roychoudhury and Prateek Saxena |
| 2012-2013 | <i>Georgia Institute of Technology, USA</i> Research Scholar Mentor: Alessandro Orso |
| 2010 | <i>NTT DATA Corporation, Japan</i> Research Internship Mentor: Yuji Shono |
| Summer 2009 | <i>Bristol Centre for Complexity Sciences, England</i> Research Internship Mentor: Mario Di Bernardo |