Manish Motwani

College of Information and Computer Sciences
University of Massachusetts
140 Governors Dr., Amherst, MA 01003-9264, USA

mmotwani@cs.umass.edu
+1-413-406-8552
https://people.cs.umass.edu/mmotwani

Research Interests

I am interested in improving software engineers' productivity by automating software engineering practices. My research involves analyzing large software repositories to learn interesting phenomena, and to use that knowledge to design novel automation techniques, such as requirements elicitation, testing, and program repair.

Education

UNIVERSITY OF MASSACHUSETTS AMHERST .... Amherst, MA, USA
Sept 2022   **Doctor of Philosophy in Computer Science**
            Dissertation: High–Quality Automatic Program Repair
            Advisor: Prof. Yuriy Brun
May 2018   **Master of Science in Computer Science**

INTERNATIONAL INSTITUTE OF INFORMATION TECHNOLOGY, HYDERABAD .... Hyderabad, TS, India
May 2011   **Bachelor of Technology (Honors) in Computer Science and Engineering**

Work Experience

COLLEGE OF INFORMATION AND COMPUTER SCIENCES, UNIVERSITY OF MASSACHUSETTS AMHERST . Amherst, MA, USA
Sept 2015 – Ongoing   Research Assistant (*Advisor: Dr. Yuriy Brun*)

SECURITY TOOLS GROUP, ONE ENGINEERING SYSTEMS, MICROSOFT .... Redmond, WA, USA
Aug 2021 – Oct 2021   Research Intern (*Advisor: Mr. Michael Fanning*)
May 2020 – Aug 2020   Research Intern (*Advisor: Mr. Michael Fanning*)

TATA RESEARCH DEVELOPMENT AND DESIGN CENTRE .... Pune, MH, India
July 2011 – July 2015   Researcher (*Advisor: Dr. Smita Ghaisas*)

CISCO SYSTEMS INDIA PVT. LTD. .... Bangalore, KA, India
May 2010 – July 2010   Software Developer Intern (*Advisor: Mr. Kiran Vishnubhatla*)

Teaching Experience

COLLEGE OF INFORMATION AND COMPUTER SCIENCES, UNIVERSITY OF MASSACHUSETTS AMHERST . Amherst, MA, USA
Fall 2021   Guest lecturer (*CS 520: Theory and Practice of Software Engineering*)
Spring 2020   Guest lecturer (*CS 520: Theory and Practice of Software Engineering*)
Fall 2018   Teaching Assistant (*CS 520: Theory and Practice of Software Engineering*)

TATA RESEARCH DEVELOPMENT AND DESIGN CENTRE .... Pune, MH, India
May 2013   Guest lecturer (*Modelling business processes using the Web Ontology Language (OWL)*)

INTERNATIONAL INSTITUTE OF INFORMATION TECHNOLOGY, HYDERABAD .... Hyderabad, TS, India
Spring 2011   Teaching Assistant (*CEG421: Building Energy Simulation*)
Fall 2010   Teaching Assistant (*CS3155: Compilers*)
Fall 2009   Teaching Assistant (*MA3200: Discrete Maths*)

Publications

Referred Journal/Conference Publications

- **Manish Motwani**, Mauricio Soto, Yuriy Brun, René Just, and Claire Le Goues, Quality of Automated Program Repair on Real-World Defects, *IEEE Transactions on Software Engineering (TSE)*, 2020. DOI: 10.1109/TSE.2020.2998785

- **Manish Motwani** and Yuriy Brun, Automatically Generating Precise Oracles from Structured Natural Language Specifications. In *proceedings of the technical track at the 41st International Conference on Software Engineering (ICSE)*, pages 188–199, Montreal, QC, Canada, May 2019. ACM artifact badges granted: Artifact Available, Artifact Reusable. DOI: 10.1109/ICSE.2019.00035

- Afsoon Afzal, **Manish Motwani**, Kathryn T. Stolee, Yuriy Brun, and Claire Le Goues, SOSRepair: Expressive Semantic Search for Real-World Program Repair, *IEEE Transactions on Software Engineering (TSE)*, 2019. DOI: 10.1109/TSE.2019.2944914

- **Manish Motwani**, Sandhya Sankaranarayanan, René Just, and Yuriy Brun, Do Automated Program Repair Techniques Repair Hard and Important Bugs?, *Empirical Software Engineering (EMSE)*, 2018. DOI: 10.1007/s10664-017-9550-0

Referred Short Conference Publications

- **Manish Motwani**, High-Quality Automated Program Repair. In *companion proceedings of the IEEE/ACM 43rd International Conference on Software Engineering: (ICSE-Companion)*, pages 309–314, Virtual (originally in Madrid, Spain), May 2021. DOI: 10.1109/ICSE-Companion52605.2021.00134.

- Smita Ghaisas, **Manish Motwani**, Balaji Balasubramaniam, Anjali Gajendragadkar, Rahul Kelkar, and Harrick Vin. Towards automating the security compliance value chain. In *proceedings of the Industrial Track at the 10th Joint Meeting on Foundations of Software Engineering (FSE)*, pages 1014–1017, Bergamo, Italy, August 2015. DOI: 10.1145/2786805.2804435

- Smita Ghaisas, **Manish Motwani**, and Preethu Rose. Detecting System Use Cases and Validations from Documents. In *proceedings of the New Ideas and Emerging Results Track at the 28th IEEE/ACM International Conference on Automated Software Engineering (ASE)*, pages 568–573, Palo Alto, CA, USA, November 2013. DOI: 10.1109/ASE.2013.6693114

Referred Workshop Publications

- Preethu R. Anish, SK. Sharma, **Manish Motwani**, and Smita Ghaisas. Knowledge-assisted Product Requirements Configurator. In *proceedings of the 4th International workshop on Product Line Approaches in Software Engineering (PLEASE)*, pages 29–32, San Francisco, CA, USA, May 2013. DOI: 10.1109/PLEASE.2013.6608660

Patents

- Smita Ghaisas, **Manish Motwani**, Preethu R. Anish, Balaji Balasubramaniam, and Aarthy Krishnamurthy. Systems and Methods for an Automated Interpretation of Legal Regulations. United States Patent # US9972016B2, May 2018.

- Smita Ghaisas, **Manish Motwani**, Preethu Rose Anish, and Shashi Kant Sharma. Automated Classification of Business Rules from Text. United States Patent # US10146762B2, Dec 2018.

Research Mentoring

- Pracheta B Amarnath (2nd year MS in CS, UMass Amherst)
  Neural-Network-based Automated Program Repair, Sept 2019 – Dec 2019.

- Dilip C. Kavarthapu (2nd year MS in CS, UMass Amherst) and Nishant Yadav (4th year PhD in CS, UMass Amherst)
  Automated Detection of Fake News from News Articles, Sept 2018 – Dec 2018

- Sandhya Sankaranarayanan (1st year MS in CS, UMass Amherst)
  Do Automated Program Repair Techniques Repair Hard and Important Bugs?, Sept 2015 – May 2016.

- Priya Wagh, Madhuri Jadhav, and Nidhi Zanwar (1st year BS students in CS, MIT Pune)
  Purpose-Centric Search for Enterprise Knowledge Reuse, Aug 2012 – April 2013.

Technical Skills

- **Research & Planning**: Identifying Problems, Gathering Information, Developing Evaluations, Calculating Results

- **Programming languages**: Working knowledge of Java, C, C++, C#, Python, Shell, R, Ruby, and PHP

- **Machine learning frameworks**: PyTorch, Keras/Tensorflow

- **Databases**: MySQL, Oracle, Kusto

- **Integrated Development Environments and tools**: Eclipse, NetBeans, MS Visual Studio, Vim, Git, Mercurial

- **Cloud platforms**: Amazon Web Services, SLURM clusters

Academic Achievements

- Became a PhD candidate at the College of Information and Computer Sciences, UMass Amherst, 2018.

- Earned B-Tech (Hons.) with academic distinction from IIIT Hyderabad, 2011.

- Featured in the Dean's List awards for academic excellence at IIIT Hyderabad, 2010.

- Placed in top 2% of the 350K students in the Indian Institute of Technology, Joint Entrance Examination, 2007.

- Placed in top 0.2% of the 500K students in the All India Engineering Entrance Examination (AIEEE), 2007.

Open–Source Software and Software Artifacts

- **Blues**: Information retrieval-based statement-level fault localization for automated program repair.
  `https://github.com/LASER-UMASS/Blues`

- **RAFL**: Combine fault localization results of multiple techniques using unsupervised rank aggregation algorithms.
  `https://github.com/LASER-UMASS/RAFL`

- **JaRFly**: Java repair framework.
  `http://JaRFly.cs.umass.edu/`

- **JaRFly replication package**: Replication package of evaluating JaRFly on the Defects4J benchmark.
  `https://github.com/LASER-UMASS/JavaRepair-replication-package`

- **Swami**: Automated test generation from natural language software specifications.
  `https://Swami.cs.umass.edu`

- **SOSRepair**: Expressive semantic search for real-world program repair.
  `https://github.com/squaresLab/SOSRepair/`

- **SOSRepair replication package**: Replication package for evaluating SOSRepair on the ManyBugs benchmark.
  `https://github.com/squaresLab/SOSRepair-Replication-Package`

- **Repair Applicability**: Data, scripts, and methodology for evaluating the applicability of automated program repair.
  `https://github.com/LASER-UMASS/AutomatedRepairApplicabilityData/`

Service

Professional Service

.... 2022 ....

PC member   Challenge track at the 14th Symposium on Search-Based Software Engineering (SSBSE)
Reviewer   ACM Transactions on Software Engineering and Methodology (TOSEM)

.... 2021 ....

PC member   Challenge track at the 13th Symposium on Search-Based Software Engineering (SSBSE)
Reviewer   ACM Transactions on Software Engineering and Methodology (TOSEM)

.... 2020 ....

Reviewer   IEEE Transactions on Software Engineering (TSE)
Sub–reviewer 42nd ACM/IEEE International Conference on Software Engineering (ICSE)
Sub–reviewer 35th IEEE/ACM International Conference on Automated Software Engineering (ASE)

.... 2019 ....

Reviewer   IEEE Transactions on Software Engineering (TSE)
Sub–reviewer 41st ACM/IEEE International Conference on Software Engineering (ICSE)
Sub–reviewer 27th ACM Joint European Software Engineering Conference and Symposium on the Foundations of Software Engineering (ESEC/FSE)

.... 2018 ....

Sub–reviewer 40th ACM/IEEE International Conference on Software Engineering(ICSE)
Sub–reviewer 26th ACM Joint European Software Engineering Conference and Symposium on the Foundations of Software Engineering (ESEC/FSE)

.... 2015 ....

Sub–reviewer 23rd IEEE International Requirements Engineering Conference (RE)

Other Service

.... 2018 ....

Graduate student representative for PhD students   College of Information and Computer Sciences, UMass Amherst

.... 2017 ....

Event–coordinator   Indian Students Association (ISA) committee, UMass Amherst

.... 2014 ....

Event–coordinator   Recreational Activities Organization committee, TRDDC, Pune

.... 2010 ....

Member of the organization committee   Felicity, annual cultural and technical fest of IIIT Hyderabad

Formal Presentations

- **High Quality Automated Program Repair.** The *Doctoral Symposium Track of the 43rd International Conference on Software Engineering(ICSE)*, Virtual (originally Madrid, Spain), May 2021.

- **Understanding Why and Predicting When Developers Adhere to the Code Quality Standards.** Microsoft's interns presentation and demos event, Virtual (originally Redmond, WA, USA), May 2020.

- **Automatically Generating Precise Oracles from Structured Natural Language Specifications.** The *Technical Track of the 41st International Conference on Software Engineering(ICSE)*, Montreal, QC, Canada, May 2019.

- **Do Automated Program Repair Techniques Repair Hard and Important Bugs?** The *Journal First Track of the 40th International Conference on Software Engineering(ICSE)*, Gothenburg, Sweden, May 2018.

- **Detecting System Use Cases and Validations from Documents.** The *New Ideas and Emerging Results Track of the 28th IEEE/ACM International Conference on Automated Software Engineering (ASE)*, Palo Alto, CA, USA, Nov 2013.

Professional Associations

| Student member | Association for Computing Machinery (ACM) | 2012 – present |
| Student member | Institute of Electrical and Electronics Engineers (IEEE) | 2019 – present |

References

- Dr. Yuriy Brun (*advisor*)
  Professor
  College of Information and Computer Sciences, University of Massachusetts Amherst, MA, USA
  https://people.cs.umass.edu/brun/
  brun@cs.umass.edu
  +1-413-577-0233

- Dr. Claire Le Goues
  Associate Professor
  Institute for Software Research, School of Computer Science, Carnegie Mellon University, Pittsburgh, PA, USA
  https://clairelegoues.com/
  clegoues@cs.cmu.edu
  +1-412-268-6954

- Dr. Arjun Guha
  Associate Professor
  Khoury College of Computer Sciences, Northeastern University, Boston, MA, USA
  http://ccs.neu.edu/~arjunguha/main/home/
  a.guha@northeastern.edu
  +1-641-275-1531

- Dr. George S. Avrunin
  Professor Emeritus, Department of Mathematics and Statistics
  Adjunct Professor, College of Information and Computer Sciences
  Department of Mathematics and Statistics, University of Massachusetts Amherst, MA, USA
  http://ext.math.umass.edu/~avrunin/
  avrunin@math.umass.edu
  +1-413-545-4251