# ThanhVu (Vu) Huy Nguyen: Curriculum Vitae

## Contents

# 1 Personal


- Name: ThanhVu (Vu) Huy Nguyen

  In Vietnamese: Nguyễn Huy ThanhVũ

- Contact Info:
  - Nguyen Engineering Building #4430, 4400 University Drive, Fairfax, VA 22030
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- Citizenship: U.S
  - DoD Secret Clearance (inactive)


**Bio.** ThanhVu (Vu) Nguyen is an assistant professor in the Department of Computer Science at George Mason University. Before that, he was at the University of Nebraska-Lincoln. He completed his Ph.D. in Computer Science at the University of New Mexico-Albuquerque and a postdoc at the University of Maryland-College Park.

Prof. Nguyen's research lies in the intersection of software engineering, programming languages, and formal methods, with a particular focus on deep neural network verification, dynamic invariant generation, and automatic program repair. He has received serveral awards for his work, including an NSF CAREER Award, an NSF CRII Award, an ACM SIGSOFT/IEEE TCSE Most Influential Paper Award, an ACM SIGEVO Impact Paper Award, a Sigma Xi Award for Excellence in Research, a CACM Research Highlight, an IFIP TC2 Manfred Paul Award for Excellence in Software: Theory and Practice, an ACM SIGEVO "Humies" Gold Medal Award, and various Distinguished and Best Paper Awards.

# 2 Education and Employment History

## 2.1 Education

- **Postdoc**, Computer Science, University of Maryland, College Park, MD 2014–2016

  Mentor: Jeff Foster

  Research Topic: Analyzing Highly-Configurable Systems and Invariant Generation
- **Ph.D.**, Computer Science, University of New Mexico, Albuquerque, NM 2007–2014

  Advisers: Stephanie Forrest and Deepak Kapur

  Dissertation: Automatic Program Repair and Dynamic Invariant Generation [T1]
- **M.S.**, Computer Science, Penn State University, Harrisburg, PA 2003–2006

  Adviser: Thang N. Bui

  Thesis: Using Ant-based Algorithms to solve NP-Complete graph problems [T2]
- **B.S.**, Computer Science, Penn State University, University Park, PA 1999–2003
- **High School**
  - Bishop McDevitt, Harrisburg, PA 1997–1999
  - McKinley High School, Honolulu, HI 1995–1997
- **Middle School**
  - Central Intermediate (now Ke'elikolani Middle School), Honolulu, HI
  - Colette, Saigon, VN

### 2.2 Employment History

- Assistant Professor, Department of Computer Science, George Mason University 2021–current
- Assistant Professor, Department of Computer Science, University of Nebraska-Lincoln 2016–2021
- Postdoc, Department of Computer Science, University of Maryland-College Park 2014–2016
- Research Assistant, Dept. of Computer Science, University of New Mexico-Albuquerque 2007–2014
- Internship, Information Technology Division, Naval Research Laboratory 2012–2013
- Internship, Advanced Technology Laboratories, Lockheed Martin 2007
- Internship, Tactical Electrical Warfare Division, Naval Research Laboratory 2004–2006

## 3 Research

### 3.1 Research Interests

Software Engineering; Programming Languages; Formal Methods; Software Testing, Verification, and Analysis; DNN Verification and Analysis; Dynamic Invariant Generation; Automatic Program Repair.

### 3.2 Publication Record

**Notes:**

- [1], [2], [3] denote co-authorship with my undergraduate, M.S., and Ph.D. students, respectively.
- **Bold journal and conference names** indicate full research papers at top-tier venues, e.g., TSE, ICSE, FSE, PLDI, OOPSLA. See csrankings.org for top CS conferences.
- In computer science, full research conference papers are full-length and rigorously reviewed by at least three peers. Top-tier conferences have acceptance rates comparable to or even lower than leading journals.
- Citations (Google Scholar): 3299, h-index 16, i10-index 22 (as of Dec'22).

#### 3.2.1 Peer Reviewed Conference Proceedings (in print)

C1 Quoc-Sang Phan, KimHao Nguyen[1], and ThanhVu Nguyen. "The Challenges of Shift Left Static Analysis". In: *International Conference on Software Engineering: Software Engineering in Practice (ICSE-SEIP)*. PDF. IEEE, 2023, to appear. ??%

C2 Simón Gutierrez Brida, Germán Regis, Guolong Zheng[3], Hamid Bagheri, ThanhVu Nguyen, Nazareno Aguirre, and Marcelo Frias. "ICEBAR: Feedback-Driven Iterative Repair of Alloy Specifications". In: ***Automated Software Engineering (ASE)***. PDF. IEEE, 2022. Acceptance 22%

C3 Guolong Zheng[3], ThanhVu Nguyen, Simón Gutiérrez Brida, Germán Regis, Marcelo Frias, Nazareno Aguirre, and Hamid Bagheri. "ATR: Template-based Repair for Alloy Specifications". In: ***International Symposium on Software Testing and Analysis (ISSTA)***. PDF. ACM, 2022, pages 666–677. Acceptance 26.6%

C4 KimHao Nguyen[1], ThanhVu Nguyen, and Quoc-Sang Phan. "Analyzing the CMake Build System". In: *International Conference on Software Engineering: Software Engineering in Practice (ICSE-SEIP)*. PDF. IEEE, 2022, pages 27–28. ??%

C5 Thanh-Dat Nguyen, Thanh Le-Cong, ThanhVu H Nguyen, Xuan-Bach D Le, and Quyet-Thang Huynh. "Toward the Analysis of Graph Neural Networks". In: *International Conference on Software Engineering-New Ideas and Emerging Results (ICSE-NIER)*. PDF. 2022. Acceptance 28%

C6 Didier Ishimwe[3], KimHao Nguyen[1], and ThanhVu Nguyen. "Dynaplex: Inferring Asymptotic Runtime Complexity of Recursive Programs". In: *2022 IEEE/ACM 44th International Conference on Software Engineering: Companion Proceedings (ICSE-Companion)*. PDF. IEEE, 2022, pages 61–64. Acceptance 50%

C7 ThanhVu Nguyen, KimHao Nguyen[1], and Hai Duong[3]. "SymInfer: Inferring Numerical Invariants using Symbolic States". In: *2022 IEEE/ACM 44th International Conference on Software Engineering: Companion Proceedings (ICSE-Companion)*. PDF. IEEE, 2022, pages 197–201. Acceptance 50%

C8 Didier Ishimwe[3], KimHao Nguyen[1], and ThanhVu Nguyen. "Dynaplex: analyzing program complexity using dynamically inferred recurrence relations". In: *Proceedings of the ACM on Programming Languages* 5.**(OOPSLA)** (2021). PDF, pages 1–23. Acceptance 34%

C9 KimHao Nguyen[1] and ThanhVu Nguyen. "GenTree: Using decision trees to learn interactions for configurable software". In: ***International Conference on Software Engineering (ICSE)***. PDF. IEEE, 2021, pages 1598–1609. Acceptance 22%, artifact paper

C10 Guolong Zheng[3], ThanhVu Nguyen, Simón Gutiérrez Brida, Germán Regis, Marcelo F Frias, Nazareno Aguirre, and Hamid Bagheri. "FLACK: Counterexample-guided fault localization for alloy models". In: ***International Conference on Software Engineering (ICSE)***. PDF. IEEE, 2021, pages 637–648. Acceptance 22%, artifact paper

C11 Simón Gutierrez Brida, Germán Regis, Guolong Zheng[3], Hamid Bagheri, ThanhVu Nguyen, Nazareno Aguirre, and Marcelo Frias. "Bounded exhaustive search of alloy specification repairs". In: ***International Conference on Software Engineering (ICSE)***. PDF. IEEE, 2021, pages 1135–1147. Acceptance 22%, artifact paper

C12 KimHao Nguyen[1] and ThanhVu Nguyen. "GenTree: Inferring Configuration Interactions using Decision Trees". In: *Automated Software Engineering-Tool Demo*. PDF. IEEE, 2021, pages 1232–1236. Acceptance 47%

C13 Guolong Zheng[3], ThanhVu Nguyen, Simón Gutiérrez Brida, Germán Regis, Marcelo F Frias, Nazareno Aguirre, and Hamid Bagheri. "FLACK: Localizing Faults in Alloy Models". In: *Automated Software Engineering-Tool Demo*. PDF. IEEE, 2021, pages 1218–1222. Acceptance 47%

C14 Simón Gutierrez Brida, Germán Regis, Guolong Zheng[3], Hamid Bagheri, ThanhVu Nguyen, Nazareno Aguirre, and Marcelo Frias. "BeAFix: An Automated Repair Tool for Faulty Alloy Models". In: *Automated Software Engineering-Tool Demo*. PDF. IEEE, 2021, pages 1213–1217. Acceptance 47%

C15 TonChanh Le, Timos Antonopoulos, Parisa Fathololumi, Eric Koskinen, and ThanhVu Nguyen. "DynamiTe: Dynamic Termination and Non-termination Proofs". In: *Proceedings of the ACM on Programming Languages* 4.**(OOPSLA)** (2020). PDF, pages 1–30. Acceptance 36%

C16 ThanhVu Nguyen, Didier Ishimwe[3], Alexey Malyshev[2], Timos Antonopoulos, and Quoc-Sang Phan. "Using Dynamically Inferred Invariants to Analyze Program Runtime Complexity". In: *International Workshop on Software Security from Design to Deployment*. PDF. 2020, pages 11–14

C17 Guolong Zheng[3], Hamid Bagheri, and ThanhVu Nguyen. "Debugging Declarative Models in Alloy". In: *2020 IEEE International Conference on Software Maintenance and Evolution*. PDF. IEEE, 2020, pages 844–848

C18 ThanhVu Nguyen and KimHao Nguyen[1]. "Using Symbolic Execution to Analyze Linux KBuild Makefiles". In: *International Conference on Software Maintenance and Evolution*. PDF. IEEE, 2020, pages 712–716. Acceptance 37%

C19 TonChanh Le, Guolong Zheng[3], and ThanhVu Nguyen. "SLING: Using Dynamic Analysis to Infer Program Invariants in Separation Logic". In: ***Programming Language Design and Implementation (PLDI)***. PDF. ACM, 2019, pages 788–801. Acceptance 27%

C20 Benjamin Mariano, Josh Reese, Siyuan Xu, ThanhVu Nguyen, Xiaokang Qiu, Jeffrey S Foster, and Armando Solar-Lezama. "Program Synthesis with Algebraic Library Specifications". In: *Proceedings of the ACM on Programming Languages* 3.**(OOPSLA)** (2019). PDF, pages 1–25. Acceptance 36%

C21 Guolong Zheng[3], Quang Loc Le, ThanhVu Nguyen, and Quoc-Sang Phan. "Automatic Data Structure Repair using Separation Logic". In: *Java PathFinder Workshop*. PDF. 2018, pages 66–66

C22 Paul Gazzillo, Ugur Koc, Thanhvu Nguyen, and Shiyi Wei. "Localizing Configurations in Highly-Configurable Systems". In: *International Systems and Software Product Line Conference (Challenge Track)*. PDF. 2018, pages 269–273

C23 ThanhVu Nguyen, Matthew Dwyer, and William Visser. "SymInfer: Inferring Program Invariants using Symbolic States". In: ***Automated Software Engineering (ASE)***. PDF. IEEE, 2017, pages 804–814. Acceptance 21%

C24 ThanhVu Nguyen, Timos Antonopoulos, Andrew Ruef, and Michael Hicks. "Counterexample-guided approach to finding numerical invariants". In: ***Foundations of Software Engineering (FSE)***. PDF. 2017, pages 605–615. Acceptance 24%

C25 ThanhVu Nguyen, Deepak Kapur, Westley Weimer, and Stephanie Forrest. "Connecting Program Synthesis and Reachability: Automatic Program Repair using Test-Input Generation". In: ***International Conference on Tools and Algorithms for the Construction and Analysis of Systems (TACAS)***. PDF. Springer, 2017, pages 301–318. Acceptance 28%

C26 ThanhVu Nguyen, Ugur Koc, Javran Cheng, Jeffrey S. Foster, and Adam A. Porter. "iGen: Dynamic Interaction Inference for Configurable Software". In: ***Foundations of Software Engineering (FSE)***. PDF. ACM, 2016, pages 655–665. Acceptance 27%

C27 ThanhVu Nguyen, Deepak Kapur, Westley Weimer, and Stephanie Forrest. "Using Dynamic Analysis to Generate Disjunctive Invariants". In: ***International Conference on Software Engineering (ICSE)***. PDF. IEEE, 2014, pages 608–619. Acceptance 20%

C28 ThanhVu Nguyen, Deepak Kapur, Westley Weimer, and Stephanie Forrest. "Using Dynamic Analysis to Discover Polynomial and Array Invariants". In: ***International Conference on Software Engineering (ICSE)***. PDF. IEEE, 2012, pages 683–693. Acceptance 21%

- **90+ citations**
- **Distinguished Paper Award**

C29 Westley Weimer, ThanhVu Nguyen, Claire Le Goues, and Stephanie Forrest. "Automatically Finding Patches Using Genetic Programming". In: ***International Conference on Software Engineering (ICSE)***. PDF. IEEE, 2009, pages 364–367. Acceptance 12%

- **10-year Most Influential Paper Award**, received in 2019 for most influential paper in the field for the 10 years.
- **800+ citations**
- **Distinguished Paper Award**
- **IFIP TC2 Manfred Paul Award for Excellence in Software: Theory and Practice**

C30 Thang Bui, ThanhVu Nguyen, and Joseph Rizzo Jr. "Parallel Shared Memory Strategies For Ant-based Optimization Algorithms". In: ***Conference on Genetic and Evolutionary Computation (GECCO)***. PDF. ACM, 2009, pages 1–8. Acceptance 41%

- **Best Paper Award**

C31 Stephanie Forrest, ThanhVu Nguyen, Westley Weimer, and Claire Le Goues. "A genetic programming approach to automated software repair". In: ***Conference on Genetic and Evolutionary Computation (GECCO)***. PDF. 2009, pages 947–954. Acceptance 41%

- **Most Impact Award**, received in 2019 for most impactful paper in the field for the last decade.
- **300+ citations**
- **Best Paper Award**

C32 ThanhVu Nguyen, Westley Weimer, Claire Le Goues, and Stephanie Forrest. "Using Execution Paths to Evolve Software Patches". In: *International Conference on Software Testing, Verification and Validation Workshops*. PDF. IEEE, 2009, pages 152–153

- **Best Short Paper Award**
- **Best Presentation Award**

C33 G Viamontes, M Amduka, J Russo, Craven M, and T Nguyen. "Efficient Memoization Strategies for Object Recognition with a Multi-Core Architecture". In: *Annual High Performance Embedded Computing Workshop*. PDF. IEEE, 2007

- **Outstanding Submission**

C34 James Smith III and ThanhVu Nguyen. "Fuzzy Decision Trees for Planning and Autonomous Control of a Coordinated Team of UAVs". In: *International Society for Optical Engineering*. PDF. SPIE, 2007

C35 James Smith III and ThanhVu Nguyen. "Genetic Program based Data Mining of Fuzzy Decision Trees and Methods of Improving Convergence and Reducing Bloat". In: *International Society for Optical Engineering*. PDF. SPIE, 2007

C36 Thang N Bui and ThanhVu H Nguyen. "An Agent-based Algorithm for Generalized Graph Colorings". In: ***Conference on Genetic and Evolutionary Computation (GECCO)***. PDF. 2006, pages 19–26. Acceptance 46%

C37 James Smith III and ThanhVu Nguyen. "Guiding Genetic Program Based Data Mining Using Fuzzy Rules". In: *Intelligent Data Engineering and Automated Learning (IDEAL)*. PDF. Springer, 2006, pages 1337–1345

C38 James Smith III and ThanhVu Nguyen. "Evolutionary Data Mining Approach to Creating Digital Logic". In: *International Conference on Informatics in Control Automation and Robotics (ICINCO)*. PDF. Springer, 2006, pages 107–113

C39 James Smith III and ThanhVu Nguyen. "Fuzzy Logic Based Resource Manager for a Team of UAVs". In: *Annual Meeting of the North American Fuzzy Information Processing Society (NAFIPS)*. PDF. IEEE, 2006, pages 463–470

- **Best Paper Award**

C40 James Smith III and ThanhVu Nguyen. "Fuzzy Logic Based UAV Allocation and Coordination". In: *International Conference on Informatics in Control Automation and Robotics (ICINCO)*. PDF. Springer, 2006, pages 81–94

C41 James Smith III and ThanhVu Nguyen. "Creating Fuzzy Decision Algorithms Using Genetic Program Based Data Mining Program". In: *Annual Meeting of the North American Fuzzy Information Processing Society (NAFIPS)*. PDF. IEEE, 2006, pages 471–477

C42 James Smith III and ThanhVu Nguyen. "Resource Manager for an Autonomous Coordinated Team of UAVs". In: *International Society for Optical Engineering*. PDF. SPIE, 2006, pages 118–129

C43 James Smith III and ThanhVu Nguyen. "Genetic Program based Data Mining to Reverse Engineer Digital Logic". In: *International Society for Optical Engineering*. PDF. SPIE, 2006, pages 24–35

C44 James Smith III and ThanhVu Nguyen. "Distributed Autonomous Systems: Resource Management, Planning, and Control Algorithms". In: *International Society for Optical Engineering*. PDF. SPIE, 2005, pages 65–76

C45 James Smith III and ThanhVu Nguyen. "Data Mining based Automated Reverse Engineering and Defect Discovery". In: *International Society for Optical Engineering*. PDF. SPIE, 2005, pages 232–242

### 3.2.2 Peer Reviewed Journal Publications (in print)

J1 Thanhvu Nguyen, KimHao Nguyen[1], and Matthew Dwyer. "Using Symbolic States to Infer Numerical Invariants". In: ***Transactions on Software Engineering (TSE)*** (2021). PDF. Impact factor 4.78

J2 ThanhVu Nguyen, Deepak Kapur, Westley Weimer, and Stephanie Forrest. "DIG: A Dynamic Invariant Generator for Polynomial and Array Invariants". In: ***Transactions on Software Engineering Methodology (TOSEM)*** 23.4 (2014). PDF, 30:1–30:30. Impact factor 2.07

J3 Claire Le Goues, ThanhVu Nguyen, Stephanie Forrest, and Westley Weimer. "Genprog: A Generic Method for Automatic Software Repair". In: ***Transactions on Software Engineering (TSE)*** 38.1 (2011). PDF, pages 54–72. Impact factor 4.78

- **Featured Article**
- **1000+ citations**

J4 Westley Weimer, Stephanie Forrest, Claire Le Goues, and ThanhVu Nguyen. "Automatic Program Repair with Evolutionary Computation". In: ***Communications of the ACM (CACM)*** 53.5 (2010). PDF, pages 109–116. Impact factor 5.41

- **Research Highlight**

- **400+ citations**

J5 Thang Bui, ThanhVu Nguyen, Chirag Patel, and Kim-Anh Phan. "An Ant-based Algorithm for Coloring Graphs". In: *Discrete Applied Mathematics* 156.2 (2008). PDF, pages 190–200. Impact factor 0.99

- **100+ citations**

J6 James F Smith III and ThanhVu H Nguyen. "Autonomous and cooperative robotic behavior based on fuzzy logic and genetic programming". In: *Integrated Computer-Aided Engineering* 14.2 (2007). PDF, pages 141–159.

#### 3.2.3 Books and Book Chapters

1. Deepak Kapur, Zhihai Zhang, Matthias Horbach, Hengjun Zhao, Qi Lu, and ThanhVu Nguyen. "Geometric Quantifier Elimination Heuristics for Automatically Generating Octagonal and Max-plus Invariants". In: *Automated Reasoning and Mathematics: Essays in Memory of William W. McCune*. Volume 7788. PDF. Springer, 2013, pages 189–228.

#### 3.2.4 Invited Talks or Keynote Speeches

1. T.Nguyen. "Scalable DNN Verification using Constraint Solving", Invited Talk, Virginia Tech (Northern VA campus), Sep. 2022
2. T. Nguyen. "Improving Software Quality using Automatic Invariant Discovery and Program Repair", Invited Talk, Summer School on Formal Techniques, May 2021
3. T. Nguyen. "Improving Software Quality using Automatic Invariant Discovery and Program Repair", Invited Talk, George Mason University, April 2021
4. W. Weimer, C. Le Goues, T. Nguyen, S. Forrest. "It Does What You Say, Not What You Mean: Lessons From A Decade of Program Repair", Plenary Sessions: Most Influential Paper, International Conference on Software Engineering (ICSE), 2019

#### 3.2.5 Dissertation

T1 ThanhVu Nguyen. "Automating Program Verification and Repair Using Invariant Analysis and Test-input Generation". PDF. PhD thesis. University of New Mexico, Aug. 2014

- **Pass with Distinction**

T2 ThanhVu Nguyen. "On the Graph Coloring Problem and Its Generalizations". PDF. Master's thesis. The Pennsylvania State University, Dec. 2006

### 3.3 Research Funding Record

#### 3.3.1 Externally Funded Grants

1. Nguyen (sole PI). *CAREER: NeuralSAT: A Constraint-Solving Framework for Verifying Deep Neural Networks*. NSF 2238133. 8/1/2023–7/31/2028, $510K (my portion: total). NSF
2. Nguyen (sole PI). *Analysis of CMake Build files using Symbolic Execution*. 2021–2022, $30K (my portion: total). Facebook/Whatsapp unrestricted gift

Table 1: Summary of Externally Research Funding.

| Project | Sponsor | Role | Dates | Total | My Portion |
|---|---|---|---|---|---|
| CAREER: DNN Verification | NSF | PI | 2023–2028 | $511K | $511K (100%) |
| Symbolic Analysis of CMake files | Facebook | PI | 2021–2022 | $30K | $30K (100%) |
| Medium: Analyzing Liveness Properties | NSF | PI | 2021–2024 | $1.2M | $400K (33%) |
| CRII: Analyzing Linux Kbuild Makefiles | NSF | PI | 2020–2022 | $175K | $175K (100%) |
| REU Support | NSF | PI | 2021–2022 | $16K | $16K (100%) |
| Predictive Failure Avoidance | Army (ARO) | Co-PI | 2019–2021 | $550K | $160K (29%) |
| Total | | | | $2.5M | $1.3M |

3. Nguyen (PI@GMU), Koskinen (PI@Stevens), Le (Co-PI@Stevens), and Antonopoulos (PI@Yale). *Collaborative: Medium: Ensuring Safety and Liveness of Modern Systems through Dynamic Temporal Analysis*. NSF 2107035; 2200621. 7/15/2021–7/14/2024, $1.2M (my portion: $400K). NSF

4. Nguyen (sole PI). *CRII: Analyzing Linux KBuild Makefiles*. NSF 1948536; 2304748. 4/1/2020–3/31/2022, $175K (my portion: total). NSF

5. Dwyer (PI) and Nguyen (co PI). *Predictive Failure Avoidance*. ARO (W911NF1910054, subcontracted from UVA to UNL). 2018–2021, $500K (my portion: $160K). Army Research Office

#### 3.3.2 Internally Funded Grants

Table 2: Summary of Internally Research Funding.

| Project | Sponsor | Role | Dates | Total | My Portion |
|---|---|---|---|---|---|
| "Analyzing Highly-Configurable System" | UNL Seed Award | PI | 2021–2021 | $10K | $10K (100%) |

### 3.4 Research Awards and Patents

#### 3.4.1 Research Awards and Recognition

1. **Faculty Early Career Development Award (CAREER)**, NSF 2023

2. **Career Research Initiation Initiative Award (CRII)**, NSF 2020

3. **10-year Most Influential Paper Award**, ACM/SIGSOFT and IEEE/TCSE 2019

   Award given for my paper C29 presented at the International Conference on Software Engineering in 2009

4. **10-year Impact Award**, ACM/SIGEVO 2019

   Award given for my paper C31 presented at the Genetic and Evolutionary Computation Conference in 2009

5. Sigma Xi Award for Excellence in Research, UNM 2014

Voted on by the faculty of the College of Engineering at the University of New Mexico-Albuquerque. Awarded annually to *one student* with outstanding research record

6. Dean's Dissertation Fellowship, $8K, UNM 2012–2013

   Voted on by the faculty of UNM. Awarded annually to *two graduating students* based on academic achievements

7. Distinguished Paper Award [C28], International Conference on Software Engineering 2012
8. Featured Article [J3], IEEE Transactions on Software Engineering 2012
9. Research Highlight [J4], Communication of ACM 2010
10. Distinguished Paper Award [C29], International Conference on Software Engineering 2009
11. **IFIP TC2 Manfred Paul Award for Excellence in Software: Theory and Practice**, $1024, International Conference on Software Engineering 2009
12. Best Paper Award (Ant Colony Optimization & Swarm Intelligence Track) [C30] Genetic and Evolutionary Computation Conference 2009
13. Best Paper Award (Genetic Programming Track) [C31], Genetic and Evolutionary Computation Conference 2009
14. **ACM SIGEVO "Hummies" Gold Medal Award**, $10000, ACM SIGVO 2009.

    For human-competitive results produced by genetic and evolutionary computation

15. Best Short Paper and Best Presentation [C32], $270, Workshop on Search-Based Software Testing 2009
16. Outstanding Submission [C33], High Performance Embedded Computing Workshop 2007
17. Best Paper Award [C39], International Conference on Informatics in Control Automation and Robotics 2006
18. Incentive Award, Naval Research Laboratory (NRL) 2005

    Award given for my internship at NRL (2 peer-reviewed conference papers for work performed during the first 6 months [C45,C44] and in total 12 conference and journal papers in 2 years)

#### 3.4.2 Patents

1. "FLACK: Counterexample-Guided Fault Localization for Alloy Models" **pending**

   Filed with U.S. Patent and Trademark Office in 8/2021, serial# 63/233,181

### 3.5 Other Research Accomplishments

- Walter Karplus Research Grant, $2.3K, IEEE Computational Intelligence Society 2009

  Summer scholarship funding for graduate students with promising research projects

- Space Grant Fellowship, $15K, NASA 2008–2010

# 4 Teaching

## 4.1 Courses

**Note** † a new course I developed

- OO Software Specification and Construction (graduate/undergraduate)
  - GMU: Fall 2022, Spring 2022, Fall 2021
  - Online course†: develop an online version of this course for GMU through Wiley publishing, Fall 2022
- Compiler Construction† (graduate/undergraduate)
  - UNL: Spring 2020, Spring 2021
- Software Testing, Verification, and Analysis† (undergraduate)
  - UNL: Fall 2019, Fall 2020
- Automata, Computation, and Formal Languages (graduate)
  - UNL: Spring 2017, Spring 2018
- Software Engineering III (undegraduate)
  - UNL: Fall 2018
- Software Verification Seminar† (graduate)
  - UNL: Fall 2016, Fall 2017, Spring 2019, Spring 2020, Spring 2021

## 4.2 Students

### 4.2.1 Current

1. Hai Duong (Ph.D. student) Fall 2022–current
   - Co-author of C7
2. Didier Ishimwe (Ph.D. student) Fall 2019–current
   - Co-author of C6, C8, C16
3. Linhan Li (Ph.D. student) Spring 2021–current
4. KimHao Nguyen (Undergraduate) Spring 2020–current
   - **Outstanding Undergraduate Research Assistant** award Spring 2021
   - **Winner**, College of Arts and Science, Nebraska Student Research Days (for GenTree C9) Spring 2021
   - UCARE award and paid hourly through NSF grants
   - Garmin Computer Engineering scholarship
   - Co-author of C4, C6, C7, C8, C9, C12, C18, J1

### 4.2.2 Graduated

1. Guolong Zheng (Ph.D., UNL) graduated, May 2022
   - First job: A10Networks
   - Co-author of C2, C3, C10, C11, C13, C14, C17, C19, C21
2. Alexey Malyshev (M.S., UNL), Fulbright scholarship graduated: Spring 2021
   - First job: Oracle

- Co-author of C16

3. Mitch Girrard (M.S., UNL), co-advised with Matthew Dwyer graduated: Fall 2019
   - Continued on Ph.D. program at UVA
4. **Undergraduate Research**: Max Nguyen (UCARE), Linhan Li (UCARE, continued on Ph.D. program at GMU), Quan Nguyen (UCARE), Ben Galusha (NSF REU), Ethan Butt (Honor Thesis), Conner Hallett (UCARE), Chase Pearson, Nancy Pham, Zixuan Hao.

### 4.3 Other Teaching Accomplishments

1. Mentor, Google Summer of Code, Project: Java PathFinder [C21] Summer 2018

## 5 Service

### 5.1 Professional Service

#### 5.1.1 Conference Committee Members (International)

PC: Program Committee

1. PC, International Symposium on Software Testing and Analysis (ISSTA) 2023
2. PC, Java PathFinder Workshop (JPF) 2022
3. Proceedings Co-Chair, International Conference of Software Engineering (ICSE) 2022
4. PC, Automated Software Engineering (ASE) 2020
5. New Faculty Symposium Panel, International Conference of Software Engineering (ICSE) 2020
6. PC, International Conference of Software Engineering Demo Track (ICSE DEMO) 2020
7. PC, International Conference of Software Engineering Posters Track (ICSE Posters) 2020
8. PC, Genetic Improvement Workshop 2020
9. PC, Java PathFinder Workshop (JPF) 2019
10. PC, Foundation of Software Engineering (FSE) 2019
11. PC, Automated Software Engineering (ASE), Journal First PC 2019
12. PC, Automated Software Engineering (ASE) 2018
13. PC, Foundation of Software Engineering (FSE) 2018
14. Challenge Track Program Committee, Systems and Software Product Line (SPLC) 2018
15. PC, Formal Methods and Models for System Design (MEMOCODE) 2018
16. External Review Committee, Programming Language Design and Implementation (PLDI) 2018
17. PC, Formal Methods and Models for System Design (MEMOCODE) 2017

18. PC, Genetic Improvement Workshop 2017
19. Artifact Evaluation Committee, Principles of Programming Languages (POPL) 2017
20. PC, Formal Methods and Models for System Design (MEMOCODE) 2016

#### 5.1.2 Journal Editorships

1. Editor Board, Journal of Systems and Software 2017–2021

#### 5.1.3 Conference Committee Member (Regional)

1. Program Co-Organizer, Midwest Big Data Summer School, Software Analytic Track 2018

#### 5.1.4 Journals Reviewers

Reviewer for Transactions on Software Engineering (TSE), Journal of Systems and Software (JSS), Transactions on Software Engineering and Methodology (TOSEM), Journal of Symbolic Computation, Journal of Evolutionary Intelligence, Transactions on Evolutionary Computation,. Average: 5 journal papers reviewed per year

#### 5.1.5 Research Review Panelists

1. Panelist, NSF Proposal Review Panel 2022, 2020 (twice), 2019

### 5.2 Other Services

1. Member, GMU CS Executive Committee 2022–
2. Member, GMU CS Web Committee 2022–
3. Member, GMU CS Ph.D. Committee 2021–
4. Member, UNL CSE Graduate CS Program Committee 2020–2021
5. Member, UNL CSE General Search Committee 2019–2020
6. Member, UNL CSE Awards Committee 2018–2019
7. Member, UNL CSE Software Engineering Search Committee 2018–2019
8. Member, UNL CSE Graduate Recruitment 2018
9. Member, UNL CSE Graduate Admission 2016–2020
10. Fellow, UNL Research Development Fellows Program 2016–2017
11. Member, UNL CSE Qualifying Exam Committee-Theory Track 2016–2018
12. Reviewer, UNL Graduate Travel Award Program Committee 2017

# 6 Miscellaneous

- My Erdős number is $\leq 4$
  - ThanhVu (Vu) Huy Nguyen $\leftrightarrow$ Thang Bui (M.S. Adviser) $\leftrightarrow$ Tom Leighton $\leftrightarrow$ Fan Chung $\leftrightarrow$ Pál Erdős
- My Math/CS Genealogy:
  - ThanhVu (Vu) Huy Nguyen $\leftrightarrow$ Deepak Kapur (Ph.D. Advisor) $\leftrightarrow$ Barbara Liskov (Turing Award 2008) $\leftrightarrow$ John McCarthy (Turing Award 1971) $\leftrightarrow$ Solomon Lefschetz $\leftrightarrow$ William Story $\leftrightarrow \ldots$
  - ThanhVu (Vu) Huy Nguyen $\leftrightarrow$ Stephanie Forrest (Ph.D. Advisor) $\leftrightarrow$ John Holland $\leftrightarrow$ Arthur Burks $\leftrightarrow$ Cooper Langford $\leftrightarrow$ Edwin Boring $\leftrightarrow$ Edward Titchener $\leftrightarrow \ldots$