# Aakash Bansal

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## Research Interests

**generative models for software engineering**, source code summarization, automatic program comprehension, bio-inspired machine intelligence, natural language processing, automatic software testing, automatic bug detection.

## Education

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| **Ph.D.** | University of Notre Dame, Computer Science & Engineering<br>Title: *Context-Aware Models for Automatic Source Code Summarization*<br>Committee: Collin McMillan, Toby Li, Joanna Santos, Vincent Hellendoorn | 2024 |
| **M.S.** | University of Surrey, Machine Learning | 2017 |
| **B.Eng.** | Lancaster University, Computer Systems Engineering | 2014 |

## Publications

*Journal Papers*

**A. Bansal**, B. Sharif, C. McMillan, "Towards Modeling Human Attention from Eye Movements for Neural Source Code Summarization", In Proceedings of ACM Human Computer Interaction, Volume 7, In proceedings of ETRA, Article 167, May 2023.

**A. Bansal**, Z. Eberhart, Z. Karas, Y. Huang, C. McMillan,"Function Call Graph Context Encoding for Neural Source Code Summarization", In the proceedings of Transactions on Software Engineering (TSE), accepted 2023.

Z. Eberhart, **A. Bansal**, C. McMillan, "A Wizard of Oz Study Simulating API Usage Dialogues with a Virtual Assistant", In the proceedings of Transactions on Software Engineering (TSE), accepted 2020 .

*Conference Full Papers*

Y.Zhang, J.Li, Z.Karas, **A. Bansal**, T. J. Li, C. McMillan, K. Leach, Y. Huang, "EyeTrans: Merging Human and Machine Attention for Neural Code Summarization", Proceedings of The ACM International Conference on the Foundations of Software Engineering (FSE 2024) (11% direct acceptance rate.)

S. Haque, **A. Bansal**, and C. McMillan, "Label Smoothing Improves Neural Source Code Summarization", In 2023 IEEE/ACM 31st International Conference on Program Comprehension (ICPC 2023), Melbourne, Australia, 2023 (31% acceptance rate.)

S. Haque, Z. Eberhart, **A. Bansal**, C. McMillan, "Semantic Similarity Metrics for Evaluating Source Code Summarization", In Proc. of the 30th IEEE/ACM International Conference on Program Comprehension (ICPC'22), Pittsburg, PA, 2022 (45% acceptance rate.)

**A. Bansal**, S. Haque, C. McMillan, "Project-Level Encoding for Neural Source Code Summarization of Subroutines", In proceedings of IEEE International Conference on Program Comprehension (ICPC'21), Held Vrituall, May 2021 (25% acceptance rate.) ***Distinguished Paper Award (one of two awarded)***

A.LeClair, **A.Bansal**, C. McMillan, "Ensemble Models for Neural Source Code Summarization of Subroutines", In 37th IEEE International Conference on Software Maintenance and Evolution (ICSME'21), Virtual, September 2021 (24% acceptance rate.)

**A. Bansal**, Z. Eberhart, L. Wu, C. McMillan, "A Neural Question Answering System for Basic Questions about Subroutines" , In proceedings of IEEE International Conference on Software Analysis, Evolution and Reengineering (SANER'21), Honolulu, Hawaii, USA, 2021 (25% acceptance rate.)

S. Haque, **A. Bansal**, L. Wu, and C. McMillan, "Action Word Prediction for Neural Source Code Summarization", In proceedings of IEEE International Conference on Software Analysis, Evolution and Reengineering (SANER'21), Honolulu, Hawaii, USA, 2021 (25% acceptance rate.)

*Conference Short Papers*

N. Tang, J. An, M. Chen, **A. Bansal**, Y. Huang, C. McMillan, T. J. Li "CodeGRITS: A Research Toolkit for Developer Behavior and Eye Tracking in IDE", International Conference on Software Engineering (ICSE 24) - Tool Demonstration Track.

**A. Bansal**, C. Su, Z. Karas, Y. Zhang, Y Huang, T. J. Li, C. McMillan, "Modeling Programmer Attention as Scanpath Prediction", In Proceedings of The 38th IEEE/ACM International Conference on Automated Software Engineering (ASE 2023) - New Ideas and Emerging Results track (36% acceptance rate.)

C. Su, **A. Bansal**, V. Jain, S. Ghanavati, C. McMillan, " A Language Model of Java Methods with Train/Test Deduplication ", In proceedings of The ACM Joint European Software Engineering Conference and Symposium on the Foundations of Software Engineering (ESEC/FSE 2023) - Tool Demonstration track (30% acceptance rate.)

*Workshop Papers*

N. Tang, M. Chen, Z. Ning, **A. Bansal**, Y. Huang, C. McMillan and T. J. Li, "An Empirical Study of Developer Behaviors for Validating and Repairing AI-Generated Code.", 13th annual workshop on the intersection of HCI and PL (PLATEAU'23), Pittsburgh, PA, 2023.

*Papers Under Peer-Review*

**A. Bansal**, C. Su, C. McMillan, "Revisiting File Context for Source Code Summarization", Under review at Springer Journal of Automated Software Engineering (AuSE).

Z. Karas, **A. Bansal**, Y.Zhang, T. J. Li, C. McMillan, Y. Huang, "A Tale of Two Comprehensions? Studying Human Attention During Code Summarization", Under Major Revision at ACM Transactions on Software Engineering and Methodology (TOSEM).

## Teaching Experience

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| **University of Notre Dame** | Teaching Assistant, Computer Vision | Fall 2018 |
| | Teaching Assistant, Programming Paradigms | Spring 2019 |
| | Teaching Assistant, Programming Paradigms | Fall 2019 |
| | Teaching Assistant, Discreet Mathematics | Spring 2021 |
| | Teaching Assistant, Graduate Operating Systems | Fall 2021 |

## Mentorship Experience

**Robert Wallace** , University of Notre Dame (2022-23)

In summer 2022, Robert started as a summer REU student for my advisor. I mentored Robert's work and advised him on new techniques for eye-tracking studies. In summer 2023, Robert started his PhD degree, following which I have mentored him to develop and administer new eye-tracking human studies.

## Presentations and Invited Talks

**Conference Paper Presentation**, "Towards Modeling Human Attention from Eye Movements for Neural Source Code Summarization", ACM Symposium on Eye Tracking Research & Applications (ETRA'23), June 2023.

**Conference Paper Presentation**, "Label Smoothing Improves Neural Source Code Summarization", IEEE International Conference on Program Comprehension (ICPC'23), May 2023.

**Invited Talk**, "Context-Aware Source Code Summarization", Rochester Institute of Technology, Feb 2023.

**Invited Talk**, "Context-Aware Source Code Summarization", University of Hawaii at Manoa, Feb 2023.

**Invited Talk**, "Function Call Graph Context Encoding for Neural Source Code Summarization", NLP+ group, University of Notre Dame, March 2022.

**Conference Paper Presentation**, "Project-Level Encoding for Neural Source Code Summarization of Subroutines", IEEE International Conference on Program Comprehension (ICPC'21), May 2021.

**Conference Paper Presentation**, "A Neural Question Answering System for Basic Questions about Subroutines", International Conference on Software Analysis, Evolution and Reengineering (SANER'21) March 2021.

## Professional Activities

**Program Committee:**

*2023* 2nd Gaze Meets ML workshop at NeurIPS 2023

*2022* 37th IEEE/ACM International Conference on Automated Software Engineering (ASE'22), Artifacts Track

**Reviewer for:**

*2022-23* IEEE Transactions on Software Engineering (TSE) **x5**

*2023-24* Springer Empirical Software Engineering (EMSE)

*2019* 9th IEEE Integrated STEM Education Conference

**Community Service:**

*2022* 27th IEEE/ACM International Conference on Automated Software Engineering, AMA Panel

## References

**Dr. Collin McMillan** (cmc@nd.edu)
Associate Professor, University of Notre Dame, Notre Dame, IN

**Dr. Bonita Sharif** (bsharif@unl.edu)
Associate Professor, University of Nebraska-Lincoln, Lincoln, NE

**Dr. Toby Li** (toby.j.li@nd.edu)
Assistant Professor, University of Notre Dame, Notre Dame, IN

**Dr. Yu Huang** (yu.huang@vanderbilt.edu)
Assistant Professor, Vanderbilt University, Nashville, TN