Ganapati Bhat

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OBJECTIVE

Ph.D. candidate in computer engineering seeking a faculty position with opportunities for research excellence and teaching. My research interests include 1) wearable internet of things (IoT) devices with a focus on energy harvesting and health monitoring applications, 2) dynamic thermal and power management of mobile processors and embedded high performance computing architectures.

EDUCATION

Ph.D., Computer Engineering   *Aug. 2014 – Aug. 2020 (Expected)*
Arizona State University, Tempe, AZ   *GPA: 3.96/4.00*
Advisor: Prof. Umit Y. Ogras
Thesis Title: Design, Optimization, and Applications of Wearable IoT Devices

B.Tech., Electronics & Communication Engineering   *July 2008 – May 2012*
Indian Institute of Technology (ISM), Dhanbad, India   *GPA: 8.33/10.00*

RESEARCH EXPERIENCE

Arizona State University
Graduate Research Associate   *Aug. 2014 - present*

Wearable IoT Devices

- Design of near-optimal energy allocation algorithms for energy harvesting IoT devices [C1, C9]
- Design of open-source hardware and software framework for health monitoring [J2]
- Design and implementation of an ultra-low-energy hardware accelerator for HAR [J1]

Dynamic Thermal and Power Management

- Investigation of the power-temperature dynamics in multiprocessor systems in terms of stability, safety, and convergence [J6, C4]
- Design of dynamic thermal and power management algorithms for mobile processors [J5]

PROFESSIONAL EXPERIENCE

Samsung R&D Institute, Bengaluru, India
Senior Software Engineer   *April 2014 - July 2014*

- Root caused and fixed a critical issue in the vendor watchdog timer driver that was causing the kernel to panic after 10 minutes of sleep. Independently debugged the issue and provided a patch.
- Analyzed the boot time of the device using bootchart and removed unnecessary logs in the user binary to speed up the boot process by about 10%.

Software Engineer   *July 2012 - March 2014*

- Debugged and resolved critical issues in watchdog timers in a Samsung Galaxy S3 Mini.
- Implemented new build scripts, which reduced the Android build time by 20-30%.

ACHIEVEMENTS AND RECOGNITIONS

- Best paper award, CASES, Embedded Systems Week	2019
- Ferdinand A. Stanchi Fellowship, Arizona State University	2019
- ASU Graduate and Professional Student Association Outstanding Research Award	2019
- ASU Graduate and Professional Student Association Outstanding Mentor Award	2019
- Engineering Graduate Fellowship, Arizona State University	2019
- Engineering Graduate Fellowship, Arizona State University	2018
- Employee of the Month Award, Samsung R&D Institute	2013

PUBLICATIONS

Patents

IP1 S. Gumussoy, **G. Bhat**, U. Y. Ogras. "Systems and Methods for Power-Temperature Stability and Safety Analysis for Multiprocessor Systems". (Provisional Patent)

Book Chapters

B1 U. Y. Ogras, U. Gupta, J. Park, **G. Bhat**. "Designing Wearable Systems-on-Polymer using Flexible Hybrid Electronics". Printed Electronics: Technologies, Applications and Challenges, Nova Science Publishers, Inc., 2017.

Journal Articles

J1 **G. Bhat**, Y. Tuncel, S. An, H. G. Lee, U. Y. Ogras. "An Ultra-Low Energy Human Activity Recognition Accelerator for Wearable Health Applications". *ACM Trans. Embedd. Comput. Syst.*, 18(5s), p. 49, 2019. [**Best Paper Award**]

J2 **G. Bhat**, R. Deb, and U. Y. Ogras. "OpenHealth: Open Source Platform for Wearable Health Monitoring". *IEEE Design & Test* 36 (5), pp. 27–34, 2019.

J3 S. K. Mandal, **G. Bhat**, C. A. Patil, J. R. Doppa, P. P. Pande, U. Y. Ogras. "Dynamic Resource Management of Heterogeneous Mobile Platforms via Imitation Learning". *IEEE Trans. Very Large Scale Integr. (VLSI) Syst. (In press)*, 2019

J4 D. Chang, **G. Bhat**, U. Y. Ogras, B. Bakkaloglu, S. Ozev. "Detection Mechanisms for Unauthorized Wireless Transmissions". *ACM Trans. Design Autom. Electron. Syst. (TODAES)* 23 (6), pp. 70:1–70:21, 2018.

J5 **G. Bhat**, G. Singla, A. K. Unver, U. Y. Ogras. "Algorithmic Optimization of Thermal and Power Management for Heterogeneous Mobile Platforms". *IEEE Trans. Very Large Scale Integr. (VLSI) Syst.* 26 (3), pp. 544–557, 2018.

J6 **G. Bhat**, S. Gumussoy, U. Y. Ogras. "Power-Temperature Stability and Safety Analysis for Multiprocessor Systems". *ACM Trans. Embedd. Comput. Syst.* 16 (5s), pp. 145, 2017.

J7 U. Gupta, C. A. Patil, **G. Bhat**, P. Mishra, U. Y. Ogras. "DyPO: Dynamic Pareto Optimal Configuration Selection for Heterogeneous MpSoCs". *ACM Trans. Embedd. Comput. Syst.* 6 (5s), pp. 123, 2017.

Conference Papers

C1 **G. Bhat**, K. Bagewadi, H. G. Lee, U. Y. Ogras. "REAP: Runtime Energy-Accuracy Management for Energy Harvesting IoT Devices". *Proc. of Design Automation Conf. (DAC)*, pp. 171:1–171:6, June 2019.

C2 **G. Bhat**, Y. Tuncel, S. An, U. Y. Ogras. "Wearable IoT Devices for Health Monitoring". *TechConnect Briefs*, pp. 357-360, June 2019.

C3 Anish NK, **G. Bhat**, J. Park, H. G. Lee, U. Y. Ogras. "Sensor-Classifier Co-Optimization for Wearable Human Activity Recognition Applications". *Proc. of Int. Conf. on Embedd. Software and Syst. (ICESS)*, pp. 1-4, June 2019. [Invited paper]

C4 **G. Bhat**, S. Gumussoy, U. Y. Ogras. "Power and Thermal Analysis of Commercial Mobile Platforms: Experiments and Case Studies". *Proc. Design, Automation & Test in Europe Conf. & Exhibition (DATE)*, March 2019. [Special Session]

C5 H. Gao, **G. Bhat**, U. Y. Ogras, S. Ozev. "Optimized Stress Testing for Flexible Hybrid Electronics Designs". *IEEE VLSI Test Symp. (VTS)*, March 2019. [**Best Paper Candidate**] (will be announced in March 2020)

C6 **G. Bhat**, R. Deb, V. V. Chaurasia, H. Shill, U. Y. Ogras. "Online Human Activity Recognition using Low-Power Wearable Devices". *Proc. of Int. Conf. on Computer-Aided Design (ICCAD)*, pp. 72:1–72:8, November 2018.

C7 **G. Bhat**, S. K. Mandal, U. Gupta, U. Y. Ogras. "Online Learning for Adaptive Optimization of Heterogeneous SoCs". *Proc. of Int. Conf. on Computer-Aided Design (ICCAD)*, pp. 61:1–61:8, November 2018. [Special Session]

C8 J. Park, **G. Bhat**, C. Geyik, H. G. Lee, U. Y. Ogras. "Energy-Optimal Gesture Recognition using Self-Powered Wearable Devices". *Proc. of Biomedical Circuits and Syst. Conf.*, pp. 1–4, October 2018.

C9 **G. Bhat**, J. Park, U. Y. Ogras. "Near-Optimal Energy Allocation for Self-Powered Wearable Systems". *Proc. of Int. Conf. on Computer-Aided Design (ICCAD)*, pp. 368–375, November 2017.

C10 **G. Bhat** et al. "Fluid Wireless Protocols: Energy-Efficient Design and Implementation". *Proc. of Symp. on Embedded Systems for Real-Time Multimedia*, pp. 22–31, October 2017.

C11 **G. Bhat**, U. Gupta, N. Tran, J. Park, S. Ozev, U. Y. Ogras. "Multi-Objective Design Optimization for Flexible Hybrid Electronics". *Proc. of Int. Conf. on Computer-Aided Design (ICCAD)*, 1-8, November 2016.

Other Papers and Reports

1. **G. Bhat**, S. Gumussoy, U. Y. Ogras. "Analysis and Control of Power-Temperature Dynamics in Heterogeneous Multiprocessors". *SRC Techcon*, 2019.

2. J. Park, **G. Bhat**, C. Geyik, H. G. Lee, U. Y. Ogras. "Optimizing Operations per Joule for Energy Harvesting IoT Devices". *Technical Report, Arizona State University*, 2018.

Posters

P1 **G. Bhat**, U. Y. Ogras. "An Online Learning Framework for Activity Recognition on Wearable IoT Devices". *ACM Student Research Competition at ICCAD*, 2019.

P2 **G. Bhat**, S. Gumussoy, U. Y. Ogras. "Analysis and Control of Power-Temperature Dynamics in Heterogeneous Multiprocessors". *SRC System-Level Design Review*, 2019.

P3 **G. Bhat**. "Wearable IoT Devices for Health Monitoring". *Ph.D. Forum at Design Automation Conference (DAC)*, 2019.

P4 **G. Bhat**. "Wearable IoT Devices for Health Monitoring". *Ph.D. Forum at Int. Conf. on Information Processing in Sensor Networks (IPSN)*, 2019.

P5 U. Gupta, **G. Bhat**, J. Park, C. Geyik, U. Y. Ogras. "Energy Harvesting Wearable Devices for Movement Disorder Analysis". *AZ Wellbeing Commons*, 2017.

P6 G. Singla, **G. Bhat**, G. Kaur, N. Matturu, A. K. Unver, U. Y. Ogras. "Predictive Dynamic Thermal and Power Management of Heterogeneous Mobile Platforms". *Connection One (C1) Annual Meeting*, 2015.

PROPOSAL WRITING EXPERIENCE

Assisted the principal investigators in writing the following proposals

- NSF: CAREER: Transforming Personalized Computing with Flexible Systems-On-Polymer (**Funded**)
- NSF: SPX: Collaborative Research: Machine Learning Inspired Design and Optimization of Heterogeneous Manycore Platforms from Mobile to Embedded HPC
- NSF: Dynamic Resource Management in Heterogenous Mobile SoCs: Novel Algorithms and Efficient Deployment of Emerging Applications
- SRC: Theoretical Limits and Novel Implementations of AI Hardware (**Funded**)
- SRC: Dynamic Optimization of Heterogeneous Systems Using Adaptive Learning (**Funded**)
- DARPA: RETICLE: Energy Harvesting IoT Devices for Situational Awareness (**Funded**)

TEACHING AND MENTORING EXPERIENCE

System-level Design for Multicore Architectures   **Fall 2017, Fall 2018**
- Introduced possible research projects to classes of 30 and 40 students, respectively
- Mentored student groups in their research projects in the class. The projects involved applications of flexible wearable devices, dynamic power management, and instrumentation of mobile SoCs.

Doctoral Students Mentored

- **Sumit K. Mandal**: Mentored Sumit in a project on dynamic management of heterogeneous system-on-chips. The project resulted in a joint paper publication with Sumit [J3].
- **Sizhe An**: Mentored Sizhe on software development for the wearable IoT devices used in the research group. Using this knowledge, he developed an algorithm for step length detection.

Masters Students Mentored

- **Vatika Chaurasia**: Mentored Vatika in implementing neural network training algorithms in Python for a human activity recognition project. The work done by Vatika with the neural networks resulted in a joint paper publication [C6].
- **Ranadeep Deb**: Mentored Ranadeep in the human activity recognition framework and data collection for the same. This work resulted in the publication of a joint paper [C6].

- **Chetan A. Patil**: Mentored Chetan in enabling the performance counter unit on the Samsung Exynos 5422 system-on-a-chip. As a result of this, Chetan was able to collect a large amount of data on the platform. The data was used in at least two papers from the group [J3, J7].
- **Ayushi Agrawal and Sai Tejwasi**: Mentored Ayushi and Sai in the development of per-core power models on the Nexus 6P phone. This experience directly helped them in securing full-time positions at Qualcomm and Intel, respectively.

Undergraduate Students Mentored

- **Nicholas Tran**: Mentored Nicholas in the implementation of a multi-objective optimization algorithm for flexible hybrid electronics. Nicholas implemented some key parts of the algorithm, which led to a joint paper with him [C11].
- **Pragathi Gopal and Abrahm Coury**: Mentored Pragathi and Abrahm in their research experience for undergraduates program. Helped them learn how data processing and machine learning is performed for human activity recognition.
- **Bhavya Sharma**: Mentor Bhavya in wearable devices when she was visiting our lab as a high school researcher. She is currently an undergraduate student at ASU.

GRANTS

- ASU Graduate and Professional Student Association Travel Grant	2017
- ACM Special Interest Group on Design Automation Travel Grant	2017
- Goa Scholar's Graduate Student Fellowship, $20,000	2014

SERVICE

Peer-Reviewing

- Reviewer, IEEE Transactions on Very Large Integration (VLSI) Systems
- Reviewer, IEEE Transactions on Computer-Aided Design of Integrated Circuits and Systems
- Reviewer, IEEE Design & Test Magazine
- Reviewer, IEEE Transactions on Mobile Computing
- Reviewer, ACM Transactions on Design Automation of Electronic Systems (TODAES)
- Reviewer, ACM Journal of Emerging Technologies in Computing Systems
- Reviewer, IET Computers & Digital Techniques
- External reviewer, Design Automation Conference
- External reviewer, International Conference on Computer-Aided Design
- External reviewer, International Conference on VLSI Design

Arizona State University

- Reviewer, GPSA Outstanding Research Award (Spring 2017, Fall 2019)
- Reviewer, GPSA Teaching Excellence Award (Spring and Fall 2017)

PROFESSIONAL MEMBERSHIPS

Student Member, Institute of Electrical and Electronics Engineers
Student Member, Association for Computing Machinery