

# YIPENG HUANG

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## EDUCATION

<b>COLUMBIA UNIVERSITY</b>	New York, NY
<i>Ph.D., computer science</i>	expected 2018
<i>M.Phil., computer science</i>	2015
<i>M.S., computer science; GPA 3.87 / 4.00</i>	2013
<i>B.S., computer engineering; minor in economics; magna cum laude; GPA 3.85 / 4.00</i>	2011

## HONORS AND AWARDS

- Heidelberg Laureate Forum 2017 participant
- DARPA Small Business Technology Transfer grant to investigate analog computing commercial applications
- Engineering Graduate Student Council Professional Development Scholarship 2017
- Columbia University Computer Engineering Award of Excellence

## JOURNAL PUBLICATIONS

- “*Analog Computing in a Modern Context: A Linear Algebra Accelerator Case Study*”  
Yipeng Huang, Ning Guo, Mingoo Seok, Yannis Tsividis, and Simha Sethumadhavan  
IEEE Micro, Top Picks Special Issue, May/June 2017
- “*Energy-Efficient Hybrid Analog/Digital Approximate Computation in Continuous Time*”  
Ning Guo, Yipeng Huang, Tao Mai, Sharvil Patil, Chi Cao, Mingoo Seok, Simha Sethumadhavan, and Yannis Tsividis  
IEEE Journal of Solid-State Circuits, vol. 51, no. 7, pp. 1514-1524, July 2016
- “*Trustworthy hardware from untrusted components*”  
Simha Sethumadhavan, Adam Waksman, Matthew Suozzo, Yipeng Huang, and Julianna Eum  
Communications of the ACM 58, 9 (August 2015), 60-71

## CONFERENCE PUBLICATIONS

- “*Hybrid Analog-Digital Solution of Nonlinear Partial Differential Equations*”  
Yipeng Huang, Ning Guo, Mingoo Seok, Yannis Tsividis, Kyle Mandli, and Simha Sethumadhavan  
2017 IEEE/ACM International Symposium on Microarchitecture (MICRO), Boston, MA, 2017  
(IEEE Micro, Top Picks honorable mention 2018)
- “*Evaluation of an Analog Accelerator for Linear Algebra*”  
Yipeng Huang, Ning Guo, Mingoo Seok, Yannis Tsividis, and Simha Sethumadhavan  
ACM/IEEE International Symposium on Computer Architecture (ISCA), Seoul, South Korea, 2016
- “*RoboBench: Towards sustainable robotics system benchmarking*”  
Jonathan Weisz, Yipeng Huang, Florian Lier, Simha Sethumadhavan, and Peter K. Allen  
IEEE International Conference on Robotics and Automation (ICRA), Stockholm, Sweden, 2016

- “Continuous-time hybrid computation with programmable nonlinearities”  
Ning Guo, Yipeng Huang, Tao Mai, Sharvil Patil, Chi Cao, Mingoo Seok, Simha Sethumadhavan, and Yannis Tsividis  
European Solid-State Circuits Conference (ESSCIRC), Graz, Austria, 2015

## **CONFERENCE PRESENTATIONS**

- “Hybrid Analog-Digital Accelerator for Differential and Algebraic Equations,”  
IEEE International Conference on Rebooting Computing, Tysons Corner, VA, November 2017
- “Hybrid Analog-Digital Solution of Nonlinear Partial Differential Equations,”  
Heidelberg Laureate Forum, Heidelberg, Germany, September 2017
- “Hybrid Analog-Digital Computing for Solving Nonlinear Systems,”  
Frontiers in Computing Systems Symposium, Columbia University, March 2017
- “Hybrid Analog-Digital Co-Processor for Scientific Computation”  
DARPA Accelerated Computation for Efficient Scientific Simulation principal investigators’ meeting  
Arlington, VA, December 2016
- “Hybrid Analog-Digital Computing for Solving Nonlinear Systems”  
Data Science Day, Columbia University, April 2016

## **TEACHING EXPERIENCE**

- T.A., Computer Hardware Design, course in RTL design, validation, synthesis Fall 2012 & 2014
- T.A., Fundamentals of Computer Systems, course in logic and architecture Fall 2010
- T.A., Object Oriented Design in Java Spring 2010

## **ACADEMIC SERVICE**

- Reviewer, IEEE Micro Magazine, 2016
- External Reviewer, IEEE International Symposium on High Performance Computer Architecture, 2014
- M.S. student applications reviewer, Columbia University Computer Science, 2014

## **PROFESSIONAL EXPERIENCE**

- SENDYNE** New York, NY  
*Research Intern* Summer 2017
  - Developed novel stochastic application-specific integrated circuit for financial modeling applications
- ALLEGORY LABS, LLC** New York, NY  
*Founder & CEO* Nov. 2015 – May 2017
  - Found IP-backed startup funded via \$100K Small Business Tech Transfer federal government contract
  - Collaborate with university subcontractor to research new class of analog numerical methods
  - Identify & assess commercial potential in modern big data & scientific computation applications
  - Communicate with Defense Advanced Research Projects Agency in-person & in response to RFI, RFP

<b>BOEING</b>	Seattle, WA
<i>Information Technology Career Foundation Program</i>	June 2011 – July 2012
<ul style="list-style-type: none"> <li>Developed prototype middleware to allow a computational fluid dynamics application run on multiple cores</li> </ul>	
<b>ZS ASSOCIATES</b>	New York, NY
<i>Business Information Specialist Intern</i>	Summer 2010
<ul style="list-style-type: none"> <li>Supported pharmaceutical client's call planning quarterly operations</li> <li>Developed and validated market reports for client sales managers using SAS and Access</li> </ul>	
<b>HUTCHISON PORT HOLDINGS</b>	Hong Kong
<i>Information Technology Intern</i>	Summer 2009
<b>INSIDE NEW YORK</b>	New York, NY
<i>Layout Editor / Graphic Designer</i>	Summer 2008

## RESEARCH EXPERIENCE

<b>HYBRID CONTINUOUS-TIME SCALABLE COMPUTATION FOR CYBER-PHYSICAL SYSTEMS</b>	Columbia University
<i>Adviser: Dr. Simha Sethumadhavan</i>	2012 - present
<ul style="list-style-type: none"> <li>Research a hybrid digital-analog architecture for accelerating differential equation solvers</li> <li>Characterize computational workloads in robotics, sensory processing, and scientific computation</li> <li>Develop applications, compiler, and instruction set to connect workload to novel microarchitecture</li> </ul>	
<b>SECURITY ENGINEERING FOR BACKDOOR-FREE CRYPTO HARDWARE</b>	Columbia University
<i>Adviser: Dr. Simha Sethumadhavan</i>	2011
<ul style="list-style-type: none"> <li>Developed an integrated circuit security design pattern to defend against malicious components</li> <li>Implemented Advanced Encryption Standard and random number generation in hardware</li> </ul>	
<b>LOCATION-TO-SERVICE TRANSLATION (LOST) PROTOCOL JAVASCRIPT API</b>	Columbia University
<i>Adviser: Dr. Henning Schulzrinne</i>	2010
<ul style="list-style-type: none"> <li>Developed an API to allow users to search for services using location information</li> </ul>	

## LEADERSHIP & SERVICE

<b>FIRST ROBOTICS COMPETITION</b>	New York, NY
<i>Team Mentor</i>	Spring 2014
<b>WASHINGTON AEROSPACE SCHOLARS PROGRAM</b>	Seattle, WA
<i>Summer Residency Mentor</i>	Summer 2012 & 2013
<b>COLUMBIA DAILY SPECTATOR</b>	New York, NY
<i>Staff Director, Design Editor, Deputy Production Editor</i>	Sept. 2007 – Dec. 2010

## SKILLS & ACTIVITIES

- Hardware:* SystemC, SystemVerilog HDL, Synopsys, Cadence, Altera EDA tools for ASIC/FPGA, Arduino
- Software:* Nvidia CUDA Thrust, Open MPI, Robot Operating System, C/C++, Java, Matlab, Docker
- Publication:* LaTeX, Jupyter, Adobe Creative Suite
- Thirteen-time marathon finisher. Personal best at 2013 New York Marathon with time of 3 hours, 25 minutes