

# Brian Anthony Smith

Mailing: 500 W 120 St, Room 450, MC 0401, New York, NY 10027 • Office: 611 CEPSR • 212-853-8455  
brian@cs.columbia.edu • <https://cs.columbia.edu/~brian> (Personal) • <https://ceal.cs.columbia.edu> (Lab)

## Research Interests

---

I develop computers that that help people perceive and interact with the world around them. My research is interdisciplinary and incorporates AI, sensing, vision, design (including game design), and accessibility.

## Education

---

**Columbia University, Graduate School of Arts and Sciences**, New York, NY

**Ph.D.** in Computer Science, Oct. 2018

Dissertation: *Unmediated Interaction: Communicating with Computers and Embedded Devices as If They Are Not There*

Advisors: Prof. Shree K. Nayar and Prof. Steven K. Feiner

**M.Phil.**, Computer Science, Feb. 2015

Candidacy Exam: *Human Computation and Crowd-Powered Vision*

**Columbia University, The Fu Foundation School of Engineering and Applied Science**, New York, NY

**M.S.**, Computer Science, Feb. 2011

**B.S.**, *summa cum laude*, May 2009 Major: Computer Science Minor: Economics

## Employment

---

- 2019–Present **Columbia University**, New York, NY  
*Assistant Professor of Computer Science*  
*Director, Computer-Enabled Abilities Laboratory (CEAL)*
- 2018–Present **Snap Research (Snap, Inc.)**, New York, NY & Santa Monica, CA  
*Research Scientist, Human–Computer Interaction (HCI) Group*
- Develop forward-looking social computing and augmented reality experiences, building a partnership between Snap Research and Snaplab (Snap’s hardware team and the creator of Spectacles).
- 2008–Present **van Biema Value Partners, LLC**, New York, NY  
*Webmaster*
- Create, update, and maintain a Web site for the value-only fund of funds.
- 2009–2018 **Columbia University**, New York, NY  
*Graduate Research Assistant, Computer Vision Laboratory & Computer Graphics and User Interfaces Laboratory*
- Performed human–computer interaction, assistive technologies, and data mining research.
- 2014 **Google Research**, Mountain View, CA  
*Software Engineering Intern, Ph.D., Mobile Interaction Research Group (MIRG)*
- Computationally optimized touchscreen keyboards for gesture typing. Published paper at CHI 2015.
- 2012 **Google Inc.**, New York, NY  
*Software Engineering Intern, Ph.D., Local Identity Team*
- Designed a new method for aggregating business listings in Google Maps and Google+ Local. An estimated 2 billion listings were improved in testing.
- 2009–2012 **Kimera, LLC** (non-profit Columbia-based startup), New York, NY  
*Designer, Producer, and Developer*
- Co-developed the Google-funded Bigshot camera and educational Web site ([bigshotcamera.org](http://bigshotcamera.org)).
  - Designed and produced Bigshot Connect, a now-defunct photo-sharing Web site for kids.
  - Co-instructed educational workshops with kids in New York, India, Vietnam, and Japan.
- 2010 **Funtank, LLC**, New York, NY  
*Game Design and Development Intern*
- Helped design and prototype a Facebook social game based on fellowship and travel.
- 2007 **Banc of America Securities** (now **Bank of America Merrill Lynch**), New York, NY  
*Sophomore Summer Analyst (Rotational Program)*

- Created client-side analytics tools in the Global Structured Products: Technology Group.
  - Performed market research and company analysis in the Financial Institutions Group.
- 2007 **Red Monsoon**, New York, NY  
*Web Development & Graphic Design Intern*
- Designed and created a Web site for the non-profit performing arts collaborative.

## Awards & Honors

---

- 2021 **Distinguished Faculty Teaching Award**, *Columbia Engineering Alumni Association (CEAA)*  
 Awarded annually to two faculty for excellence in teaching and dedication to undergraduate students.
- 2019 **Kavli Fellow**, *National Academy of Sciences*  
 Awarded to distinguished young scientists in the US and abroad.
- 2015–2017 **“From Data to Solutions” Integrative Graduate Education & Research Traineeship (IGERT)**, *NSF*  
 A 2-year interdisciplinary data science training program. Covers full tuition, fees, and travel expenses.
- 2013, 2015 **Computer Science Service Award (×2)**, *Dept. of Computer Science, Columbia University*  
 Awarded to the Ph.D. students whose service contributions to the department are in the top 10%.
- 2012 **Extraordinary Teaching Assistant Award**, *Columbia Engineering*  
 Awarded to the 19 TAs throughout the school with the highest Fall 2011 student evaluations (\$500).
- 2011–2014 **National Defense Science and Engineering Graduate (NDSEG) Fellowship**, *U.S. Dept. of Defense*  
 \$31,000/year + tuition + fees for 3 years. There were 200 awardees from over 2,900 applications.
- 2009–2010 **Center for Technology, Innovation, & Community Engagement Fellowship**, *Columbia Engineering*  
 Covers half-tuition for a year for 10 PhD students each year. I was the first and only MS student awardee.
- 2009 **Computer Science Scholarship Award (Departmental Award)**, *Columbia Engineering*  
 Awarded to the top computer science graduate each year.
- 2009 **Costantino Colombo Outstanding Leadership Service Award**, *Columbia Engineering*  
 Awarded to a graduating student for enhancing undergraduate student life. I was the inaugural awardee.
- 2007–2009 **Benjamin A. Tarver, Jr. Memorial Scholar**, *Columbia Engineering*  
 An endowed grant that covered full undergraduate tuition and fees for 2 years.
- 2005–2009 **C. Prescott Davis Scholar**, *Columbia Engineering*  
 A 4-year co-curricular program awarded to the top 2% of applicants to Columbia Engineering.

## Conference Publications (Fully Refereed)

---

- [C5] Nair, V., Karp, J., Silverman, S., Kalra, M., Lehv, H., Jamil, F., and **Smith, B. A.** (2021). NavStick: Making Video-Games Blind-Accessible via the Ability to Look Around. *Proceedings of the 34th Annual ACM Symposium on User Interface Software and Technology (UIST 2021)*. 14 pages. [Acceptance Rate: 21%]  
 Paper: <https://doi.org/10.1145/3472749.3474768> Talk: [https://youtu.be/oAu\\_Q\\_2YU\\_E](https://youtu.be/oAu_Q_2YU_E)
- [C4] **Smith, B. A.** & Nayar, S. K. (2018). The RAD: Making Racing Games Equivalently Accessible to People Who Are Blind. *Proceedings of the 2018 CHI Conference on Human Factors in Computing Systems (CHI 2018)*. Paper 516, pp. 1–12. [Acceptance Rate: 25.7%]  
 Paper: <https://doi.org/10.1145/3173574.3174090> Talk: <https://youtu.be/pwI7IGywICA>
- [C3] **Smith, B. A.** & Nayar, S. K. (2016). Mining Controller Inputs to Understand Gameplay. *Proceedings of the 29th Annual ACM Symposium on User Interface Software and Technology (UIST 2016)*. pp. 157–168. [Acceptance Rate: 20.6%]  
 Paper: <https://doi.org/10.1145/2984511.2984543> Talk: [https://youtu.be/\\_a03zIXoTYU](https://youtu.be/_a03zIXoTYU)
- [C2] **Smith, B. A.**, Bi, X., & Zhai, S. (2015). Optimizing Touchscreen Keyboards for Gesture Typing. *Proceedings of the 2015 CHI Conference on Human Factors in Computing Systems (CHI 2015)*. pp. 3365–3374. [Acceptance Rate: 22.9%]  
 Paper: <https://doi.org/10.1145/2702123.2702357> Talk: <https://youtu.be/0PHjN4GjSi8>
- [C1] **Smith, B. A.**, Yin, Q., Feiner, S. K., & Nayar, S. K. (2013). Gaze Locking: Passive Eye Contact Detection for Human–Object Interaction. *Proceedings of the 26th Annual ACM Symposium on User Interface Software and Technology (UIST 2013)*. pp. 271–280. [Acceptance Rate: 19.6%]  
 Paper: <https://doi.org/10.1145/2501988.2501994>

## Demos and Workshops

---

- [D2] Nair, V., Ma, B., Huddleston, H., Lin, K., Hayes, M., Donnelly, M., Gonzalez, R., He, Y., & **Smith, B. A.** (2021). Towards a Generalized Acoustic Minimap for Visually-Impaired Gamers. *Proceedings of the Adjunct Publication of the 34th Annual ACM Symposium on User Interface Software and Technology (UIST '21 Adjunct)*. 3 pages.
- [D1] Nair, V. & **Smith, B. A.** (2020). Toward Self-Directed Navigation for People with Visual Impairments. *Proceedings of the Adjunct Publication of the 33rd Annual ACM Symposium on User Interface Software and Technology (UIST '20 Adjunct)*. pp. 139–141.
- [W1] Bi, X., **Smith, B. A.**, & Zhai, S. (2015). Keyboard Layout Optimization. *Proceedings of the CHI 2015 Workshop on Principles, Techniques, and Perspectives on Optimization and HCI*.

## Book Chapters

---

- [BC1] Bi, X., **Smith, B. A.**, Ouyang, T., & Zhai, S.. (2018). Soft keyboard performance optimization. In A. Oulasvirta, P. O. Kristensson, X. Bi, & A. Howes (Eds.), *Computational interaction* (pp. 121–152). Oxford: Oxford University Press. ISBN: 9780198799610

## Patents

---

- [P2] US 10,897,564: SHARED CONTROL OF CAMERA DEVICE BY MULTIPLE DEVICES (2021).
- [P1] US 9,96,743: METHODS, SYSTEMS, AND MEDIA FOR DETECTING GAZE LOCKING (2018).

## Leadership & Professional Service

---

- 2019–Present **Steering Committee, Summer School on Computational Interaction**
- 2021 **Program Committee, ACM UIST 2021**
- 2021 **Program Committee, Snap Creative Challenge**
- 2020 **Program Committee, Snap AR Creative Challenge at ACM IMX 2020**
- A semester-long challenge to reimagine augmented reality (AR) storytelling, funded by Snap Inc.
  - Culminates in a live workshop at ACM IMX 2020.
- 2019–2020 **Reviewer, NSF Graduate Research Fellowship Program (GRFP)**
- 2019 **Co-Organizer, 5<sup>th</sup> Summer School on Computational Interaction**
- Co-organized weeklong event w/ Prof. Xiaojun Bi of Stony Brook U. and hosted it at Columbia.
  - Featured 8 faculty and 29 students (many international), whose median review score was 5/5.
- 2019 **Program Committee, ACM ETRA 2019**
- 2019 **Reviewer, National Defense Science and Engineering Graduate (NDSEG) Fellowship Program**
- 2014–Present **Peer Reviewer for Academic Conferences & Journals**
- Conferences:*
- ACM UIST 2014, 2015, 2016, 2019, 2020
    - ★ *Special Recognition for Exceptional Reviewing* ×2 (UIST 2015, UIST 2016) ★
  - ACM CHI 2015, 2016, 2017, 2018, 2019, 2020, 2021
    - ★ *Special Recognition for Exceptional Reviewing (CHI 2016)* ★
  - ACM VRST 2017
- Journals:*
- PACM Interact. Mob. Wearable Ubiquitous Technol. (2017, 2019)
  - Elsevier Int. J. Hum. Comp. Stud. (2016)
- 2012 **Columbia University Department of Computer Science, New York, NY**
- MS Admissions Committee Volunteer*
- Reviewed ~150 applications and conducted phone interviews for the department's MS Program.

- 2006–2009 **Columbia University Undergraduate Recruitment Committee**, New York, NY  
*SEAS and Scholars Chair, Advisory Board (2007–2009)*
- Helped recruit, select, train, and manage Undergraduate Recruitment Committee volunteers.  
 ★ *Most Likely to Convince Someone to Come to Columbia Award* ★
- Senior Interviewer (2007–2009)*
- Conducted regional interviews of high school applicants to Columbia from underserved areas.
- 2005–2008 **Columbia University Scholar’s Program (CUSP) Alliance**, New York, NY  
*Vice President of Operations (2006–2008)*
- Developed policies and structures of governance for the 24 officers and 7 committees.

## Mentoring & Advising

---

- 2019–Present **Ph.D. Students**, Columbia University
- Vishnu Nair (Fall 2019–present)
  - Gaurav Jain (Fall 2020–present)
- 2011–Present **M.S. Students**, Columbia University
- Yuanyang Teng (Spring 2021–present)
  - David Cho (Spring 2021–present)
  - Yunhao Xing (Spring 2021–present)
  - Hollis Lehv (Fall 2020 – Spring 2021)
  - Samuel Silverman (Fall 2019 – Summer 2020)
  - Aditi Hudli (Fall 2019)
  - Julie Chien (Spring 2017)
  - Ray Tsai (Spring 2017)
  - Sophia Erbo Lee (Fall 2011 – Spring 2012)
  - Vu Xuan Linh (Spring 2011)
- 2011–Present **Undergraduate Students**, Columbia University and Barnard College
- Emily Li (Spring 2021–present)
  - Brian Ma (Fall 2020–present)
  - Jessica Peng (Spring 2021)
  - Ivy Cao (Fall 2019 – Spring 2020)
  - Seok Jun Jeon (Fall 2019 – Spring 2020)
  - Annie Kim (Fall 2019 – Spring 2020)
  - Thé Ngo (Fall 2019 – Spring 2020)
  - António Câmara (Spring 2020)
  - Carl Dobrovic (Spring 2020)
  - Yiwen Gao (Spring 2020)
  - Sarah Leventhal (Spring 2020)
  - Benjamin Most (Spring 2020)
  - Carlos Rosas (Spring 2020)
  - Kenny Yuan (Spring 2020)
  - Jake Bullock (Spring 2016)
- 2011–Present **Egleston Scholars Enhanced Advising Committee**, Center for Student Advising, Columbia Univ.
- Advised current students, recruited prospective students, and helped shape pedagogy for this comprehensive advising program for top 1% of Columbia Engineering undergraduate admits.
- Students Advised (in alphabetical order):*
- Eshan Agarwal, Arvind Chava, Jessica Cheng, Campbell Donnelly, Haris Durrani, Drew Feldman, Fei-Tzin Lee, Kai-Zhan Lee, Sang Jun Park, Lucas Schuermann, Steven Shao, SonYon Song, Kui Tang (Next Stop: Ph.D. student at Columbia), Morgan Thompson, James Xu, Kevin Zeng, Alek Zieba
- 2007–Present **Career and Professional Advising**
- Su Ji Park (B.S.; Fall 2017)
  - Ian Huang (B.S.; Summer–Fall 2017; Next Stop: Intel internship)
  - Daniel Sims (Research Staff; Spring–Summer 2017)

- Sam Cohen (B.S.; Spring 2016–Fall 2017)
- Chun-Yu Tsai (Ph.D.; Fall 2015; Next Stop: Facebook Research)
- Jiongxin Liu (PhD; Spring 2015; Next Stop: Google)
- Sean Pagaduan (M.F.A.; Fall 2014 & Fall 2015; Next Stop: Union Theological Seminary)
- Fiamma van Biema (B.S.; Fall 2013; Next Stop: Teachers College, Columbia U. M.A. graduate)
- Hua Papoj Thamjaroenporn (B.S.; Fall 2011; Next Stop: Ph.D. student at Columbia)
- Babawande Afolabi (B.S.; Fall 2007; Next Stops: Goldman Sachs internship, Stanford M.B.A. graduate)
- Kwesi Thomas (B.S.; Fall 2007; Next Stop: Deloitte Consulting)

## Teaching Experience

---

2019–Present **Instructor**, Columbia University

*Graduate Level Courses:*

- COMS E6998: Human–Computer Interaction (Spring 2021)  
30 students      Evaluations canceled this semester
- COMS W4170: User Interface Design (Fall 2020)  
125 students      Instructor eval.: Mean: 4.79 / 5 (SD: 0.59), Median: 5 / 5  
★ *Distinguished Faculty Teaching Award (Columbia Engineering)* ★
- COMS W4170: User Interface Design (Fall 2019)  
80 students      Instructor eval.: Mean: 4.79 / 5 (SD: 0.47), Median: 5 / 5

2009–2013 **Teaching Assistant**, Columbia University

*Graduate Level Courses:*

- COMS W6732: Computational Imaging (Fall 2013)  
Instructor: Prof. Shree K. Nayar
- COMS W4731: Computer Vision (Fall 2011)  
Instructor: Prof. Shree K. Nayar  
★ *Extraordinary Teaching Assistant Award* ★
- COMS E6998: Advanced Game Development (Spring 2011)  
Instructor: Prof. Bernard Yee
- COMS W4995: Game Design and Production (Fall 2010)  
Instructor: Prof. Bernard Yee
- COMS E6998: Advanced Game Development (Spring 2010)  
Instructor: Prof. Bernard Yee

*Undergraduate Level Courses:*

- ENGI EI 102: Design Fundamentals using Advanced Computer Technologies (Spring 2010)  
Instructor: Prof. Jack McGourty
- ENGI EI 102: Design Fundamentals using Advanced Computer Technologies (Fall 2009)  
Instructor: Prof. Jack McGourty

2010–2012 **Co-Instructor**, Kimera, Inc. (non-profit Columbia-based startup)

- Co-instructed Bigshot Camera STEM workshops with kids in New York, India, Vietnam, and Japan.

2010 **Co-Instructor**, Center for Technology, Innovation, and Community Engagement (CTICE) STEM Club

- A hands-on afterschool program at IS 195 targeted for fifth grade students struggling in science.
- Designed curriculum and hands-on projects. Co-instructed with Guru Krishnan.

2006–2015 **Private Tutor**, New York, NY

*College Level Subjects:*

- COMS W4731: Computer Vision (Columbia University; Fall 2017)
- MATH 101: Concepts of Mathematics [Logic and set theory] (Nassau Commun. Col.; Summer 2017)
- MATH 125: Precalculus (Hunter College, City University of New York; Fall 2015)
- COMS W1004: Introduction to Computer Science and Programming in Java (Columbia; Spring 2014)
- ECON W1105: Principles of Economics (Columbia University; Fall 2013)
- SCNC C1000: Frontiers of Science (Columbia University; Fall 2013)
- URBS UN3200: Spatial Analysis: GIS Methods and Case Studies (Barnard College; Spring 2013)

- URBS V3562: The City in Beta: Public Participation in the Design Process (Barnard College; Fall 2012)
- MATH VI201: Calculus III (Columbia University; Fall 2012)
- SCPP BC 3335: Environmental Leadership, Ethics, and Action (Barnard College; Fall 2011)
- EESC BC1002: Environmental Science II (Barnard College; Spring 2011)
- EESC BC3014: Field Methods in Environmental Science (Barnard College; Fall 2010)
- MATH VI 101: Calculus I (Columbia University; Fall 2009)
- GRE Math Prep

*High School Level Subjects:*

- Algebra I, Geometry, Algebra II, Pre-Calculus, Calculus I, Physics I, Chemistry I, SAT Prep
- Tutored for both English- and French-speaking high schools

## Invited Talks and Panel Appearances

---

- Oct. 2021 **“AI and New Abilities”**  
Moody’s Corporation, New York, NY
- Sept. 2021 **“AI and New Abilities: Video Games for Blind Players”**  
XR Access Research Network, New York, NY  
Recording: [https://youtu.be/NLMgPp\\_yMaY](https://youtu.be/NLMgPp_yMaY)
- Feb. 2021 **“Designing Assistive Technologies for Agency: Blind-Accessible Video Games and Audio Navigation Tools”**  
Stanford University, Stanford, CA
- Nov. 2020 **“Toward Self-Directed Navigation for People with Visual Impairments”**  
Microsoft Research, Redmond, WA
- 2018 (x6) **“Analyzing Human Behavior to Make HCI More Useful”**
  - Yale University, New Haven, CT (Apr. 2018)
  - Cornell University, Ithaca, NY (Apr. 2018)
  - Fordham University, New York, NY (Mar. 2018)
  - Johns Hopkins University, Baltimore, MD (Mar. 2018)
  - Princeton University, Princeton, NJ (Mar. 2018)
  - Columbia University, New York, NY (Feb. 2018)
- Feb. 2018 **“Solving ‘Last Mile’ Computing Problems in HCI”**  
Snap, Inc., Los Angeles, CA
- Jun. 2017 **“The Bigshot Camera: A Case Study in Making Technology Educational”**  
Engineering for Humanity strategic discussion forum of faculty. Columbia University, New York, NY
- Sep. 2014 **“Game Design: An Introduction”**  
d:Tech NYC seminar at Cornell Tech, New York, NY.
- Aug. 2010 **“The Potential and Pitfalls of Tutoring/Mentoring and Service-Learning”**  
New York Metro Area Partnership for Service Learning (NYMAPS) panel, New York, NY.
- Jul. 2010 **“Composting”**  
Summer Youth Employment Program (SYEP) lecture. NYC Dept. Parks and Recreation, New York, NY.
- Jul. 2010 **“Alternative Fuel Vehicles”**  
Summer Youth Employment Program (SYEP) lecture. NYC Dept. Parks and Recreation, New York, NY.
- Jul. 2010 **“Static Forces”**  
WINgineering (Women in Engineering) summit. NYC Dept. Parks and Recreation, New York, NY.
- Jul. 2010 **“Youth and Cybersecurity”**  
Moderated focus group in partnership with NGO. East West Institute, New York, NY.

## References

### **Shree K. Nayar**

Professor, Computer Science  
Columbia University  
nayar@cs.columbia.edu  
+1 212 939 7092

520 West 120 Street  
450 Mudd Hall, Mail Code 0401  
New York, NY 10027

### **Shumin Zhai**

Senior Research Scientist  
Google, Inc.  
zhai@google.com  
+1 408 476-6038

### **Steven K. Feiner**

Professor, Computer Science  
Columbia University  
feiner@cs.columbia.edu  
+1 212 939 7083

520 West 120 Street  
450 Mudd Hall, Mail Code 0401  
New York, NY 10027

### **Xiaojun Bi**

Assistant Professor, Computer Science  
Stony Brook University  
xiaojun@cs.stonybrook.edu  
+1 631 632 2506

161 New Computer Science (NCS)  
Stony Brook University  
Stony Brook, NY 11794-2424