

## **Dr. Alexander D. Wissner-Gross**

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School of Engineering and Applied Science  
Harvard University  
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### **Overview**

Alexander D. Wissner-Gross is a Fellow at the Harvard University Center for the Environment. Dr. Wissner-Gross has authored 14 publications, received 90 national and international distinctions, and been issued 7 full and pending patents. His patents have been licensed or sublicensed to 7 materials, computing, and communications companies. In 2003, he became the last person in MIT history to receive a triple major, with bachelors in Physics, Electrical Engineering, and Mathematics, while graduating first in his class from the MIT School of Engineering. In 2007, he received his Ph.D. in Physics from Harvard for work on programmable surfaces, which dramatically increased the computational versatility of a range of materials. Dr. Wissner-Gross's research has been featured in Technology Review, BusinessWeek, USA Today, Scientific American, and The New York Times. Before his science and technology career, Dr. Wissner-Gross performed as a boy soprano with the New York City Opera.

### **Interests**

Planetary-scale computing; economics and computation; green computing; smart grid networks; distributed trust management; programmable interconnects and materials; nanoelectronics.

### **Experience**

2007-Present Postdoctoral and Environmental Fellow, Harvard University

### **Education**

2003-2007 Ph.D., Physics, Harvard University  
A.M., Physics, Harvard University  
1999-2003 S.B., Physics, M.I.T.  
S.B., Electrical Engineering, M.I.T. (1st out of ~550)  
S.B., Mathematics, M.I.T.  
1995-1999 Great Neck South High School, Great Neck, NY (1st out of 225)

### **Distinctions**

2009 Featured Young Innovator, NSF National Science Board  
2009 Certificate of Appreciation, IEEE Computer Society of Connecticut  
2008 Finalist, Crunchies Startup Awards (“Most Likely to Make the World a Better Place”)  
2008 Hertz Doctoral Thesis Prize Winner, Fannie and John Hertz Foundation  
2008 Featured Entrepreneur, MIT Chairman's Salon

2008 Y Combinator Founder (Summer 2008)  
 2008 Winner, Summer@Highland Entrepreneurship Program (declined)  
 2008 Environmental Fellowship, Harvard University Center for the Environment  
 2007 Harold T. White Prize for Excellence in Teaching, Harvard Physics Department  
 2007 Nominee, Derek C. Bok Award for Excellence in Graduate Student Teaching of Undergraduates  
 2007 Dan David Prize Scholarship for Future Energy applications, Tel Aviv University  
 2007 Graduate Student Silver Award, Materials Research Society  
 2006 Finalist, named one of top 6 directors in amateur category, Materials Research Film Festival  
 2006 Nanotechnology paper selected for Institute of Physics Journal Highlights  
 2006 Book Prize, Harvard's Derek Bok Center for Teaching and Learning  
 2006 Harvard University Certificate of Distinction in Teaching  
 2006 Nominee, Harvard's Joseph R. Levenson Memorial Teaching Prize (only Physics nominee)  
 2004 First place (5km race) and Second place (500m race) team in division, Jichuan Cup International Dragon Boat Invitational Tournament for University Students in Tianjin, China  
 2003 Harvard Purcell Fellowship  
 2003 Malcolm Cotton Brown Award as top ranked MIT senior pursuing experimental physics  
 2003 Runner-Up, Stanford Entrepreneur's Challenge  
 2003 Finalist, MIT \$50K Entrepreneurship Competition  
 2003 Henry Ford II Scholar Award, MIT School of Engineering  
 2003 Fannie and John Hertz Foundation Fellowship  
 2003 One of 20 named to USA Today All-USA 1st Academic College Team  
 2003 National Defense Science and Engineering Graduate Fellowship (declined)  
 2003 DOE Computational Science Graduate Fellowship (declined)  
 2003 NSF Graduate Research Fellowship (declined)  
 2002 British Marshall Scholarship (declined)  
 2002 Winner in Tiny Technologies Category, MIT \$1K Entrepreneurship Competition  
 2002 Elected to Tau Beta Pi (engineering) and Eta Kappa Nu (electrical & computer engineering) honor societies  
 2002 First place nationally, Inaugural Intel Undergraduate Research Award  
 2001 Barry M. Goldwater Scholar  
 2001 Letters of commendation (top 2%) in 3 of the 4 core MIT EECS courses  
 2000 Director's Award, MITRE Corporation  
 2000 National Dean's List  
 1999 National Winner, New Technology, NITA Young Inventors & Creators Competition  
 1999 American Academy of Achievement's Salute to Excellence (personally sponsored by Lemelson Foundation)  
 1999 First place nationally, American Scholastic Mathematics Association (ASMA)  
 1999 Honorable Mention, First Step to Nobel Prize in Physics  
 1999 Valedictorian, Great Neck South High School

- 1999 National Winner, 10th Place, Intel Science Talent Search
- 1999 Inducted into National Young Inventors' Hall of Fame, National Gallery for America's Young Inventors
- 1999 One of 20 named to USA Today All-USA 1st Academic High School Team
- 1999 Lucent Global Science Scholar
- 1999 United States Navy Science Achievement Award
- 1999 Tandy Technology Scholar
- 1999 Grand Prize Winner, USA Math Talent Search (USAMTS)
- 1999 First Place, Army Physics Award, International Science and Engineering Fair (ISEF)
- 1999 Intel Best Use of PC Award, International Science and Engineering Fair (ISEF)
- 1999 Second Place, Physics Grand Award, International Science and Engineering Fair (ISEF)
- 1999 Second Place, Air Force Physics Award, International Science and Engineering Fair (ISEF)
- 1999 American Association of Physics Teachers Award, International Science and Engineering Fair (ISEF)
- 1999 Citation for Excellence, Nassau County Legislature
- 1999 International Honor Winner, Canadian Open Mathematics Challenge
- 1999 Honored Scholar, National Alliance for Excellence
- 1999 National AP Scholar
- 1999 National Merit Finalist
- 1998-1999 Who's Who Among American High School Students
- 1998-1999 First place in Senior Division with perfect score, American Computer Science League (ACSL)
- 1998 Member of U.S. team at International Olympiad in Informatics (IOI)
- 1998 Second place nationally, USA Computer Olympiad Finals
- 1998 First Place individual, Fall Open Competition of USA Computer Olympiad
- 1998 First place nationally with perfect score, USA Math Talent Search (USAMTS)
- 1998 Winner and top-scoring American, Email Informatics Competition (EIC)
- 1998 Winner, Long Island Software Award
- 1998 Highest Scoring Student Award, American Scholastic Mathematics Association (ASMA)
- 1998 George Washington University School of Engineering & Applied Science Medal
- 1998 National Winner, Computer Science, NITA Young Inventors & Creators Competition
- 1998 Third place American and 14th place internationally, Central European Olympiad in Informatics (CEOI)
- 1998 First place out of 20,000 students with perfect score, Canadian Mathematics Fermat Competition
- 1998 First Place, C++, Continental Math League Computer Contest
- 1997 Fourth Place, Intel Grand Award in Computer Science, International Science and Engineering Fair
- 1997 Fourth place nationally, USA Computer Olympiad Fall Championship
- 1997 First place and top scoring U.S. sophomore, American Computer Science League (ACSL)
- 1997 Ross Young Scholar, Ohio State University
- 1997 AT&T Student Software Award, Long Island Software Awards

- 1997 Certificate of Achievement, Mathematical Contest in Modeling
- 1997 Certificate of Merit, The Assembly of the State of New York
- 1997 Certificate of Distinction, American High School Mathematics Examination
- 1997 Summa Cum Laude, National Latin Exam
- 1996-1998 Columbia University Science Honors Program
- 1996 Perfect Score, National Latin Exam
- 1995-1996 Creative Problem-Solving Institute for Gifted and Talented Students
- 1995 Summa Cum Laude, National Latin Exam
- 1995 First Place, Pascal, Continental Math League Computer Contest
- 1994-1995 John Hopkins Center for Talented Youth (CTY)
- 1994 State and Regional Award, Mathematics and Verbal Talent Search
- 1992-1993 Performed with the New York City Opera Company as a boy soprano

## **Publications**

- 15. A. D. Wissner-Gross, C. E. Freer, M. D. Welsh. “Planetary-scale network arbitrage,” In preparation.
- 14. A. D. Wissner-Gross, T. M. Sullivan. “Pervasive monitoring of the environmental footprint of network activity,” Invited.
- 13. B. P. Timko, A. D. Wissner-Gross, W. Lu, A. B. Greytak, C. M. Lieber, “Single-crystal silicon nanotubes, hollow nanocones, and branched nanotube networks,” Submitted to editor.
- 12. A. D. Wissner-Gross, “Dielectrophoretic architectures,” Nano-Scale and Bio-Inspired Integrated Computing, (ed. M. Eshaghian-Wilner, Wiley, 2009)
- 11. A. D. Wissner-Gross, “Intruder dynamics on vibrofluidized granular surfaces,” Mater. Res. Soc. Symp. Proc. 1152E, TT03-01 (2009).
- 10. L. Cong, A. D. Wissner-Gross, “Interrogating single molecules,” Rec. Pat. Nanotech. 2, 19-24 (2008).
- 9. A. D. Wissner-Gross, “Pattern formation without favored local interactions,” J. Cell. Auto. 4, 27-36 (2008).
- 8. A. D. Wissner-Gross, “Physically programmable surfaces,” Ph.D. Thesis, Department of Physics, Harvard University (2007).
- 7. A. D. Wissner-Gross, E. Kaxiras, “Diamond stabilization of ice multilayers at human body temperature,” Phys. Rev. E Rapid Comm. 76, 020501 (2007).
- 6. A. Hatzor-de Picciotto, A. D. Wissner-Gross, G. Lavalley, P. S. Weiss, “Arrays of Cu(2+)-complexed organic clusters grown on gold nano dots,” J. Exp. Nanosci. 2, 3-11 (2007).
- 5. A. D. Wissner-Gross, T. M. Sullivan, “Multicolor symbology for remotely scannable 2D barcodes,” Proc. SPIE 6623, 662304 (2007).
- 4. A. D. Wissner-Gross, T. M. Sullivan, “Legibly printing entire books onto single surfaces,” Libr. J. 132, S12-S13 (2007).
- 3. A. D. Wissner-Gross, “Dielectrophoretic reconfiguration of nanowire interconnects,” Nanotechnology 17, 4986-4990 (2006).

2. A. D. Wissner-Gross, "Preparation of topical reading lists from the link structure of Wikipedia," Proc. IEEE ICALT 6, 825-829 (2006).
1. E. Wissner-Gross, A. D. Wissner-Gross, "People with disabilities," Journalism Across Cultures, 203-220 (ed. F. Cropp, Iowa State Press, 2003).

## **Patents**

7. A. D. Wissner-Gross, E. Kaxiras, "Diamond stabilization of ice multilayers at human body temperature," U.S. Provisional Patent 61/053,737 (Filed 27 May 2008).
6. A. D. Wissner-Gross, T. M. Sullivan, "Environmental footprint monitor for computer networks," U.S. Provisional Patent 61/013,366 (Filed 13 December 2007; Converted 15 December 2008), International Application WO/2009/076667 (Filed 15 December 2008).
5. A. D. Wissner-Gross, T. M. Sullivan, "Human-powered mobile visual search and feedback," U.S. Provisional Patent 60/955,995 (Filed 15 August 2007; Converted 7 August 2008).
4. A. D. Wissner-Gross, T. M. Sullivan, "Multicolor symbology for remotely scannable codes," U.S. Provisional Patent 60/918,736 (Filed 19 March 2007).
3. A. D. Wissner-Gross, "Method for creating a topical reading list," U.S. Patent Pending 60/758,512 (Filed 12 January 2006; Converted 12 January 2007).
2. A. D. Wissner-Gross, "Method of robotic manipulation utilizing patterned granular motion," U.S. Patent 6,335,059 (Issued 1 January 2002).
1. A. D. Wissner-Gross, "Robotic manipulation system utilizing patterned granular motion," U.S. Patent 6,216,631 (Issued 17 April 2001).

## **Service**

- 2009-Present Member of Advisory Board, Global Green Consulting Group
- 2009-Present Referee, Software: Practice and Experience
- 2009-Present Referee, Journal of Electronic Materials
- 2009-Present Invited Member, International Telecommunication Union (ITU) Dynamic Coalition on Internet and Climate Change (DCICC)
- 2008-Present Referee, Applied Physics Letters
- 2007-Present Member of Editorial Advisory Board, Recent Patents on Nanotechnology