History of Women in Computing and Women Leaders in Computing


Susan Rodger
Duke University

June 9, 2015
Microsoft Research
Bellevue, WA
My Background

- Professor of the Practice of Computer Science
- Area: Visualization and Animation, Computer Science Education
- Passionate about education/diversity
  - SIGCSE Chair
- CRA-W Board Member
Also known for Edible CS
• Undergraduates
  • Research – DREU, CREU
• Graduate Students
  • Graduate Cohort (years 1-3)
  • Discipline Specific Workshops
• Faculty, Government/Industry Labs
  • Career Mentoring Workshops
    • Early and Mid-Career
• Other programs/projects
How Visible are Notable Women in Computer Science?

• Pondered this question in early 2012
• Looked at Wikipedia
  • The internet encyclopedia
  • Who writes those pages?
  • Why did some notables have pages and others not?
• Turing Award Winners
  • Only two women at that time
Fran Allen

- School teacher – got a job at IBM
- Compilers and Optimization Technology
- IBM Fellow – First Women
- Turing Award (2006) – First Woman
- The Turing Award was announced on Feb. 21, 2007
- Her Wikipedia page was created on...
  - Feb. 6, 2007
- On Feb 21, 2007 the Turing Award was added to her Wikipedia page.
Fran Allen has made outstanding contributions to the field of programming languages for more than forty-five years, and her work has significantly influenced the wider computer science community.

Ms. Allen is a pioneer in the field of optimizing compilers. Her achievements include seminal work in compilers, code optimization, and parallelization. In the early 1980s, she formed the Parallel TRANslation (PTRAN) group to study the issues involved in compiling for parallel machines. The group was considered one of the top research groups in the world working with parallelization issues. Her work on these projects culminated in algorithms and technologies that form the basis for the theory of program optimization and are widely used in today's commercial compilers throughout the industry.

Ms. Allen's influence on the IBM community was recognized by her appointment as an IBM fellow, the first woman to receive this recognition. She was also president of the IBM Academy of Technology. The Academy plays an important role in the corporation by providing technical leadership, advancing the understanding of key technical areas and fostering communications among technical professionals.

In 1997, Ms. Allen was inducted into the WITI Hall of Fame. Ms. Allen retired from IBM in 2002.
Three days later...

Frances E. Allen

From Wikipedia, the free encyclopedia

Fran Allen is a pioneer in the field of optimizing compilers. Her achievements include seminal work in compilers, code optimization, and parallelization.

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Turing Award Announced and added to her page

In 1997, Ms. Allen was inducted into the WITI Hall of Fame. Ms. Allen retired from IBM in 2002.

Early 2007, she became the first woman to win the A.M. Turing Award.

Categories: Turing Award laureates
In the next three days

• Over 30 edits, added awards, boards

Awards and honors

Allen is a member of the National Academy of Engineering, a fellow of the IEEE, the Association for Computing Machinery (ACM) and the American Academy of Arts and Sciences. She is currently on the Computer Science and Telecommunications Board, the Computer Research Associates (CRA) board and National Science Foundation's CISE Advisory Board.

In 1997, Allen was inducted into the WITI Hall of Fame. She retired from IBM in 2002 and won the Augusta Ada Lovelace Award that year from the Association for Women in Computing. In 2007, she became the first woman to win the A.M. Turing Award.
Frances E. Allen

From Wikipedia, the free encyclopedia

For the early American nun, see Frances Allen (nun).

Frances Elizabeth "Fran" Allen (born August 4, 1932) is an American computer scientist and pioneer in the field of optimizing compilers. Her achievements include seminal work in compilers, code optimization, and parallelization. She also had a role in intelligence work on programming languages and security codes for the National Security Agency.[2][3]

Allen was the first female IBM Fellow and in 2006 became the first woman to win the Turing Award.[4]

Career [edit]

Allen grew up on a farm in Peru, New York and graduated from The New York State College for Teachers (now State University of New York at Albany) with a B.Sc. degree in mathematics in 1954.[8] She earned an M.Sc. degree in mathematics at the University of Michigan in 1957 and began teaching school in Peru, New York.[8] Deeply in debt, she joined IBM on July 15, 1957 and planned to stay only until her school loans were paid, but ended up staying for her entire 45-year career.

Fran Allen's work has had an enormous impact on compiler research and
Barbara Liskov

- Turing Award (2008)
- Currently Institute Professor at MIT
- One of the first women to get a PhD in CS in the U.S. (1968) – thesis on chess

Research

- Venus operating system
- Design and Implementation of CLU
- Argus, high-level language for distributed programs
- Thor, object oriented database system

Many awards – NAE, AAAS, Fellow ACM

Had a Wikipedia page since before Turing Award
Barbara Liskov

Barbara Liskov is a professor in the Electrical Engineering and Computer Science department at the Massachusetts Institute of Technology.
39 minutes later ....
Barbara Liskov

Barbara Liskov (born November 7, 1939 as Barbara Jane Huberman) is an American computer scientist[2] who is an institute professor at the Massachusetts Institute of Technology and Ford Professor of Engineering in its School of Engineering's electrical engineering and computer science department.[3]

Contents

1 Life and career
2 Recognition and awards
3 See also
4 References
5 External links

Life and career

Liskov was born in 1939 California, the eldest of Jane (née Dickhoff) and Moses Huberman's four children.[4] She earned her BA in mathematics at the University of California, Berkeley in 1961. In 1968 she became one of the first women in the United States to be awarded a Ph.D. from a computer science department when she was awarded her degree from Stanford University. The topic of her Ph.D. thesis was a computer

Born
Barbara Jane Huberman
November 7, 1939 (age 75)
California

Nationality
American

Fields
Computer science
Shafi Goldwasser

- I was in algorithms, followed her career.
Dr. Shafi Goldwasser (born 1956) is the RSA Professor of electrical engineering and computer science at MIT, and a professor of mathematical sciences at the Weizmann Institute of Science, Israel. Born in New York City, she obtained her B.S. (1979) in mathematics from Carnegie Mellon University, and M.S. (1981) and Ph.D (1983) in computer science from UC Berkeley. She joined MIT in 1983, and in 1997 became the first holder of the RSA Professorship.

Goldwasser's research areas include complexity theory, cryptography and computational number theory. She is the co-inventor of zero-knowledge proofs, which probabilistically and interactively demonstrate the validity of an assertion without conveying any additional knowledge, and are a key tool in the design of cryptographic protocols. Her work in complexity theory includes the classification of approximation problems, showing that some problems in NP remain hard even when only an approximate solution is needed.

For these groundbreaking results, Goldwasser has twice won the Gödel Prize in theoretical computer science: first in 1993 (for "The knowledge complexity of interactive proof systems"), and again in 2001 (for "Interactive Proofs and the Hardness of Approximating Cliques"). Other awards include the ACM Grace Murray Hopper Award (1996) for outstanding young computer professional of the year and the RSA Award in Mathematics (1998) for outstanding mathematical contributions to cryptography. In 2001 she was elected to the American Academy of Arts and Sciences.
Shafi Goldwasser

From Wikipedia, the free encyclopedia

Shafi Goldwasser (Hebrew: שפי גולדווסר; born 1958) is an American-born Israeli computer scientist. She is a professor of electrical engineering and computer science at MIT, and a professor of mathematical sciences at the Weizmann Institute of Science, Israel.[4][5][6][7]

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2 Scientific career
3 Awards
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Biography [edit]

Born in New York City, Goldwasser obtained her B.S. (1979) in mathematics and science from Carnegie Mellon University, and M.S. (1981) and PhD (1984) in computer science from the University of California, Berkeley under the supervision of Manuel Blum, who is well known for advising some of the most prominent researchers in the field. She joined MIT in 1983, and in 1997 became the first holder of the RSA Professorship. She became a professor at the Weizmann Institute of Science, concurrent to her professorship at MIT, in 1993. She is a member of the Theory of Computation group at MIT Computer Science and Artificial Intelligence Laboratory.[6] Goldwasser was a co-recipient of the 2012 Turing Award.[5]

Scientific career [edit]

Goldwasser’s research areas include computational complexity theory, cryptography...
What about other Notable Women in Computer Science?

• ACM Fellows
  • Few women
    • 1994 first year over 130 Fellows
      • 9-12 were women? Less than 10%
  • About 20-50 Fellows per year
  • 2014 – 47 fellows, 6-8 women
• Noticed few of Women had Wikipedia pages
Investigate New CRA-W Project

• Write Wikipedia pages for Notable women in Computing

• How hard is it to write a Wikipedia page?
  • Lots of rules you have to follow

• Another area with few women
  • 2013 study – 16% of Wikipedia writers are female
Some Rules in Writing Wikipedia Biography pages

• You cannot write your own page!
• Neutral point of view
• Person must be notable
• No original research
  • Must write only facts and reference them
  • Must be verifiable
  • Do not plagiarize – write in your own words
• Regard for subject’s privacy
  • NOT A TABLOID!
Wrote a Wikipedia page

• We had no idea what we were doing....
• At a CRA-W Board meeting in April 2012

• Who to write?
  • Female Turing Award winners had pages
  • All two of them
Mary Jane Irwin

• Professor at Penn State University
• VLSI Architecture and Automated Design
• Board Level Designs
  • Arithmetic Cube, MGAP, and SPARTA
• Architecture, Logic & Circuit Design Tools
  • ARTIST, PERFLEX, LOGICIAN, DECOMPOSER
• Awards
  • National Academy of Engineering
  • ACM Fellow, IEEE Fellow
• No Wikipedia page!
In writing her Wikipedia page,

Here is what happens when you don’t know what you are doing...
What happens when you don't know what you are doing
Spent some time figuring out basics of how to write a biography page

• Checked out other pages
• Did some edits on pages

• Then tried again
Mary Lou Soffa

- Professor at University of Virginia
- Programming languages
- Compiler technology
- Software Engineering
- Ken Kennedy Award, 2012
  - “provided analytical and experimental models for understanding, predicting and verifying the optimization of software”
- ACM Fellow, 1999
- IEEE Fellow, 2012
- Presidential Award for Excellence in Science, Math and Engineering Mentoring, 1999
I think I figured out how to do it.
Carla Ellis

- Emeritus Professor Duke University
- Operating Systems
- Energy Management on Mobile Devices
- ACM Fellow
Another One

This article is an orphan, as no other articles link to it. Please introduce links to this page from related articles; suggestions may be available. (November 2012)
Wrote a page for her advisor
Also an ACM Fellow
Figured out how to add a picture
Pictures must be added to Wikimedia and be public
Feeling confident, I do another page
Wrote page offline and dropped in
But still figuring things out
There is a format for URL

References

This article uses bare URLs for citations. Please consider adding full citations so that the article remains verifiable. Several templates and the Reflinks tool are available to assist in formatting. (Reflinks documentation) (March 2013)

3. ^ http://fellow.acm.org
Putting References in

• Simplest way – Bare URL:
  <ref> reference here </ref>

• Better way – Full Citation:
  <ref> {{cite web
    |author=
    |url=
    |title=
    |publisher=
    |date=
    |accessdate=
  }}</ref>
Page edited and flagged by others quickly

Edited by Smileguy91 in One Minute!
Warning added in 3 Minutes!

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Do people create new pages?

• James Bonk
  • Duke Chemistry Professor for 53 years
  • Famous for the flat tire story
  • The University Medal at Duke University
  • Died March 15, 2013
  • No Wikipedia page
  • Lots of Newspaper articles

• Waited three days, then created his page.
  • Others started editing the page
James Bonk – “Bonkistry”

James Frederick Bonk (February 6, 1931 – March 15, 2013) was an American university professor noted for eschewing a research career in favor of teaching introductory chemistry courses for over 50 years, primarily at Duke University.[1] He did, however, also teach advanced and graduate courses, and wrote his own textbooks and laboratory manuals. His students fondly labeled his main chemistry class Bonkistry.[2][3]

Education and career [edit]

Bonk obtained a B.S. in Chemistry in 1953 from Carroll College (Waukesha, Wisconsin). He obtained a Ph.D. in chemistry in 1958 from Ohio State University.

While a graduate student at Ohio State University, he received a DuPont Lecturing Fellowship that enabled him to teach there and to coordinate the teaching of introductory chemistry classes at OSU's branch campuses. He also taught summers at Muskingum College.

In 1959 he joined the Department of Chemistry at Duke University as an assistant professor and rose to the rank of full professor for teaching and research. He retired in 2006.
Mary Jean Harrold

• CS Professor at Georgia Tech
• Software Engineering
• Foundational research on static analysis and testing of software
• In 2007, ACM named her top software engineering researcher in the world

• ACM Fellow, IEEE Fellow
• Died of cancer, Sept 19, 2013
• Wrote Wikipedia page Sept 21, 2013
Mary Jean Harrold

Mary Jean Harrold (March 12, 1947 - September 19, 2013) was an American computer scientist noted for her research on software engineering. She was also noted for her leadership in broadening participation in computing. She was on the boards of both CRA and CRA-W and was Co-Chair of CRA-W from 2003-2006. [1]

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Biography [edit]
Harrold received a B.A. in Mathematics in 1970 and a M.S. in Mathematics in 1975, both from Marshall University. Harrold taught secondary mathematics in West Virginia, South Carolina, Ohio, and Pennsylvania from 1970-1982. She then attended graduate school at the University of Pittsburgh. She received a M.S. in Computer Science in 1985 and a Ph.D in Computer Science in 1988, both from University of Pittsburgh. Her dissertation advisor was Prof. Mary Lou Soffa.
Susan Horwitz

• CS Professor at Univ of Wisconsin
• Area of programming languages, software engineering
• Known for program slicing and data-flow analysis
• Several best paper awards and teaching awards
• Chair of AP CS, Peer Led Team Learning with Computer Science
• Created Wikipedia page March 29, 2014
• Died June 11, 2014 of stomach cancer
Susan B. Horwitz

From Wikipedia, the free encyclopedia

For the biochemist, see Susan Band Horwitz.

**Susan Beth Horwitz** (January 6, 1955 – June 11, 2014) was an American computer scientist noted for her research on programming languages and software engineering, and in particular on program slicing and dataflow-analysis. She had several best paper and an impact paper award mentioned below under awards.

She was an award winning teacher at her institution and was the founder of Peer Led Team Learning for Computer Science (PLTLCS), creating the Wisconsin Emerging Scholars-Computer Science (WES-CS) program. She took the lead for an NSF ITWF Grant 0420343 that was a collaboration between eight schools doing PLTLCS, including the University of Wisconsin-Madison with Horwitz, Duke University, Georgia Tech, Rutgers University, University of Wisconsin at Milwaukee, Purdue University, Beloit College, and Loyola College. They published a paper in 2009[1] that showed that active recruiting combined with peer-led team learning is an effective approach to attracting and retaining under-represented students in an introductory Computer Science class. She was also noted for her leadership in computing in high schools. She was a member of the Educational Testing Services Advanced Placement Computer Science Test Development Committee for ten years from 1987-97, including chairing the committee for five years from 1995-97.
How do others get Wikipedia pages written? – grad students
Wrote a Guide on How to Write Wikipedia Biography
www.cs.duke.edu/csed/wikipedia
Our Wikipedia Guide

• Shorter and more focused than Wikipedia Guide

• Getting Started
  • Get an account
  • Edit some pages

• Select someone to write about
  • Make sure they don’t already have a page
Our Database of Notable Women in CS

- Over 300 women
- Why notable
- Status of their Wikipedia page
- Forms for adding women and updating status

<table>
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<th>Title/Position</th>
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<td>ACM Fellow</td>
<td>has a page, needs work</td>
</tr>
</tbody>
</table>
Creating a new Wikipedia page

• Copy our template to get started
• Make it a short simple page
  • Education, few awards, links to a few papers
• Search for the name you want the title of the page to be, click to create that page
Creating a new Wikipedia Page (cont.)

- To put in a picture – Search in Wikimedia commons, or ask them to put in a picture.
- Write facts and try to find sources to confirm those facts
  - News release announcing ACM Fellows
  - Don’t cut and paste from webpages!
- Link from other pages to their page
- Use standard format for references
  - Our guide has several examples
Create a Writer page in Wikipedia

• List Wikipedia pages you have written (and link to them)

• See https://en.wikipedia.org/wiki/User:Shrodger

• Written over 20 pages
User:Shrodger

From Wikipedia, the free encyclopedia

I am a computer science professor at Duke University. I am interested in writing Wikipedia pages of notable Computer Scientists, especially women computer scientists since there are so few pages written about them.

Biographies I have started as new pages [edit]

- Nancy M. Amato - IEEE Fellow
- Thomas E. Anderson - Margaret Martonosi's advisor, also an ACM Fellow
- Jean-Loup Baer - Carla Ellis' advisor, also an ACM Fellow
- James Bonk - Emeritus Duke Professor (deceased) - Taught Chemistry for over 50 years at Duke University, and known as an internet legend for giving a makeup exam to two students who missed an exam because they had a flat tire, and putting them in separate rooms to take the exam and asking them on the exam "which tire?"
- Alan H. Borning - A. J. Brush's advisor, also an ACM Fellow
- A. J. Bernheim Brush - Borg Early Career Award
- Tracy Camp - ACM Fellow
- Lori A. Clarke - ACM Fellow
- Nell B. Dale - ACM Fellow
- Susan J. Eggers - ACM Fellow
- Carla Ellis - ACM Fellow
- Maria L. Gini - AAAI Fellow and ACM Distinguished Scientist
- Mary Jean Harrold - ACM Fellow
- Susan B. Horwitz - ACM SIGSOFT Retrospective Impact Paper award
- Patricia D. Lopez (Patty Lopez) - HP Technical Leadership Award 2001
Margaret Martonosi

- Professor at Princeton
- Computer Architecture
- Mobile Computing, power-efficient systems
- Wattch power modelling tool
- ZebraNet
- ACM Fellow, IEEE Fellow
- Technical Leadership ABIE Award Winner
Margaret Martonosi is an American computer scientist noted for her research in computer architecture and mobile computing with a particular focus on power-efficiency. In the area of power-aware computer architecture, Martonosi is known for her work on the Wattch power modeling infrastructure. Among the first architecture-level power modeling tools, Wattch demonstrated that early-stage power modeling tools could be accurate enough to allow computer architects to assess processor power consumption early enough in the design process for power to have a substantive influence on design choices. Martonosi's group has also performed research on real-system power measurement, and on power and thermal management.

In the area of mobile systems, some of Martonosi's early work included the design and deployment of mobile sensors for tracking zebras in Kenya. This work demonstrated the use of delay tolerant protocols and low-power GPS devices for wildlife tracking. More recently, Martonosi has researched human mobility patterns and has developed novel mobile applications for crowdsourcing traffic information.

She is also noted for her leadership in broadening participation in computing. She was previously on the CRA-W Board from 2005-2013.
Nancy Amato

• Professor
• Texas A&M University
• Motion planning and Robotics
• Computational biology
• Parallel and Distributed Computing
• IEEE Fellow, AAAS Fellow
• CRA A. Nico Habermann Award
Nancy M. Amato is an American Computer Scientist noted for her research on the algorithmic foundations of motion planning, computational biology, computational geometry and parallel computing. Her paper on probabilistic roadmap methods (PRMs) is one of the most important papers on PRM. It describes the first PRM variant that does not use uniform sampling in the robot's configuration space. She wrote a seminal paper with one of her students that shows how the PRM methodology can be applied to protein motions, and in particular protein folding. This approach has opened up a new research area in computational biology. This result opens up a rich new set of applications for this technique in computational biology. Another paper she wrote with her students represents a major advance by showing how global energy landscape statistics such as relative folding rates and population kinetics can be computed for proteins from the approximate landscapes computed by Amato's PRM-based method. In another paper she and a student wrote introduced a novel technique, approximate convex decomposition (ACD), for partitioning a polyhedron into approximately convex pieces. Amato also co-leads the STAPL project with her husband Lawrence Rauchwerger, who is also a computer scientist at the University of Illinois, Urbana-Champaign. She is an elected member of the National Academy of Engineering and a fellow of the Association for Computing Machinery (ACM). She was elected to the National Academy of Sciences in 2018.

**Born:** Portland, Oregon, US

**Nationality:** American

**Fields:** Computer Science

**Institutions:**
- Texas A&M University
- University of Illinois at Urbana-Champaign
- University of California, Berkeley
- Stanford University

**Alma mater:**
- University of Illinois at Urbana-Champaign
- University of California, Berkeley

**Doctoral advisor:** Franco P. Preparata

**Doctoral students:**
- Steve Wilmarth
- Daniel Vallejo
- Greg Schmidt
- Lucia Dale
- Woohso Son
- O. Burchan Bayazit
- Guang Song
- Jinsuck Kim
- Jyh-Ming Lien
- Xinyu Tang
- Marco Morales
- Lydia Tapia
Still get Warning messages

• Most recent is

This article's introduction may be too long for the overall article length. Please help by moving some material from it into the body of the article. For more information please read the layout guide and Wikipedia's lead section guidelines. (July 2014)
Nancy M. Amato

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Nancy M. Amato is an American Computer Scientist noted for her research in computational biology, computer science, and increasing participation in computing. She is a member of the committee of CRA-W, of which she is a co-founder.

In 1985, Amato received a B.S. in Mathematical Sciences from Stanford University. She received a M.S. in Computer Science from the University of California at Berkeley in 1988 and a Ph.D. in Computer Science from the University of Illinois at Urbana-Champaign in 1995.

She then joined the Department of Computer Science at Texas A&M University as an Assistant Professor in 1995. She was promoted to Associate Professor in 2000, to Professor in 2004, and to University Professor in 2011.

Nancy M. Amato

Born
Portland, Oregon, US
Nationality
American
Fields
Computer Science
Institutions
Texas A&M University
University of Illinois at Urbana-Champaign

Alma mater
University of Illinois at Urbana-Champaign

Doctoral advisor
Franco P. Preparata

Doctoral students
Steve Wilmarth
Daniel Vallejo
Greg Schmidt
Lucia Dale
Wookho Son
O. Ercan Bayazit
Guang Song
Jinsuck Kim
Jyh-Ming Lien
Xinyu Tang
Marco Morales
Lydia Tapia
Shawna Thomas
Gabriel Tapia

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Nancy M. Amato

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Wikipedia store
Mary Jane Irwin

Mary Jane Irwin is the Evan Pugh Professor and A. Robert Noll Chair in Engineering in the Department of Computer Science and Engineering at Pennsylvania State University. She has been on the faculty at Penn State since 1977. She is an international expert in computer architecture. Her research and teaching interests include computer architecture, embedded and mobile computing systems design, power and reliability aware design, and emerging technologies in computing systems.
To Share These Achievements....

• August 2014, with Katy Dickinson and Jessica Dickinson Goodman....

• Created Notable Women in Computing cards
Vicki Hanson
Had no Wikipedia page, now does