

Shashi Shekhar

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Computer Science & Engineering
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Awards and honors and year received (list--no more than *five* items):

- 2015: University Consortium for GIS (UCGIS) Education Award. Each year, UCGIS recognizes one scholar with this award. Shashi was selected in 2015 outstanding contributions including a definitive textbook on spatial databases (Prentice Hall 2003), which has educated an entire generation of GIS scholars. Other highly influential contributions include an authoritative Encyclopedia of GIS (Springer 2008) and a popular massively open online course titled "From GPS and Google Maps to Spatial Computing" (Coursera, Fall 2014).
- 2010: Named a key difference maker for the field of Geographic Information Systems (GIS) and biography featured in the most popular GIS textbook (Geographic Information Science and Systems, 3rd Edition, Wiley, 2010), co-authored by Prof. M. Goodchild, a member of the National Academy of Sciences.
- 2008: Elected a Fellow of American Association for Advancement of Science (AAAS) for distinguished contributions to the advancement of science in the fields of spatial databases, spatial data mining and GIS.
- 2006: IEEE Computer Society Technical Achievement Award for the foundational, technical and commercial impact of Connectivity Clustered storage and Access Method (CCAM) for roadmaps and navigation application. This award recognizes an outstanding and innovative contribution usually within the past ten years.
- 2003: Elected an IEEE Fellow for contributions to spatial database storage methods, data mining, and GIS.

Have you previously been involved in any CRA activities? If so, describe.

- March 2015: Represented CRA in the U.S. Congressional reception on Deconstructing Precision Agriculture and made a presentation on Computer Science contributions such as Geographic Information Systems (GIS), which is used widely to represent and analyze precision agriculture data. This congressional event was organized by the House Agriculture Committee with help from the Task Force on American Innovation the Computing Research Association to showcase the contributions of science to the citizens represented by U.S. Congress members from rural communities. Speakers included U.S. farmers, leading agriculture technology companies, and scientists. This activity was described in [an article](#) in CRA Computing News (April 2015, Vol. 27/No. 4).
- July 2012 – July 2015: Served on the Computing Community Consortium (CCC) Council of the Computing Research Association (CRA). Led the Blue Sky tracks initiative to help over a dozen major conferences (e.g., AAI 2015, ACM SIG-Spatial 2015, ACM SIGSOFT FSE 2014) to catalyze community to pursue bold new research directions. Also helped set up CCC presentation at the annual meeting ACM SIG board.
- 2012 - 2013: Co-organized the CRA/CCC visioning workshop titled "From GPS and Virtual Globes to Spatial Computing 2020" to investigate a community research agenda in light of transformative development ranging from Google Maps to Uber, which have enriched billions of lives. Prepared workshop report and made presentations at federal agencies (e.g., NIH/NCI, NIST, USDOE/ANL) to explore funding initiative in the area. A gist of the report has been accepted for publication as a perspective paper (4000 words) in the Communications of the ACM and is scheduled for the January 2016 issue.
- September 2015: CRA Congressional Fly-in: Participated in the congressional fly to ask members of

Congress to support robust funding for Computer Science.

- October 2015: Organized an NSF workshop to identify data science research challenges in the upcoming cross-directorate multi-year NSF INFEWS initiative. The goal of this workshop was to engage computing community in the emerging national priority area of food, energy, water across agencies such as NSF, USDOE, USDA, EPA, USGS, NASA, etc. Due to the community significance, this activity was described in an [article](#) in CRA Computing News (November 2015, Vol. 27/No. 10).

List any other relevant experience and year(s) it occurred (list--no more than *five* items).

- National Academies: Shashi served on many committees of the U.S. national academies committees including Models of World for National Geospatial-Intelligence Agency (2015), Geo-targeted Disaster Alerts and Warning (2013), Future Workforce for Geospatial Intelligence (2011), Mapping Sciences (2003-2009), and Priorities for GEOINT Research (2005-2006). Many of these committees produced reports, which were published by national academies press.
- Research Project Management: Directed the Army High Performance Computing Research Center (2005-2007) with about 50 faculty members across 6 universities with an annual budget of \$5M/year. Recently directed an NSF IGERT (2006-2012) project with two dozen faculty members across half a dozen departments.
- Educational contributions include a definitive textbook on spatial databases (Prentice Hall 2003), which has educated an entire generation of GIS scholars. Other contributions include an authoritative Encyclopedia of GIS (Springer 2008) and a popular massively open online course titled "From GPS and Google Maps to Spatial Computing" (Coursera, Fall 2014), which attracted over 21,000 students across 182 countries. Shashi also shaped the Computer Science component of GIS body of knowledge developed by the University Consortium on GIS. He was also instrumental in creation of a professional Master in GIS degree and an undergraduate minor at the University of Minnesota.
- Boards: Shashi is currently serving on the board of directors for the Symposium on Spatial and Temporal Databases Endowment (2014-2019). Earlier, he served on the board of director of the University Consortium for GIS (UCGIS) (2003) and helped the UCGIS president to organize a congressional breakfast on GIS and homeland security (February 2004) and develop a consensus research agenda.
- Journals & Conferences: As a co-Editor-in-chief, Shashi helped Springer's "GeoInformatica: An International Journal on Computer Science Advances for GIS" become a top-tier GIS journal. He also served as a special-issue co-editor for ACM Transactions on Intelligent Systems and Technology (5(1), 2013) and an editor for the IEEE Transactions on Knowledge and Data Engineering (1996-2000). Shashi co-chaired the International Conference on Geographic Information Science (2012) and International Symposium on Spatial and Temporal Databases (2011), where he introduced an inaugural track on challenge and vision papers with a sponsorship from the Computing Community Consortium (CCC).

Research interests: (list only)

- Spatial Computing
- Geographic Information Systems

Personal Statement

Traditional sources of support for computing research are at risk due to federal budget deficit concerns. This is alarming given upcoming major growth in the computing research community to respond to booming enrollments and job-market. As a CRA board member, my highest priority will be to explore new funding sources for the computing community. I participated in recent CCC meetings with industry to

explore ways to increase industry support for computing research. I also organized an NSF workshop to involve our community in new major multi-agency multi-year federal initiative towards understanding the nexus of food, energy and water security.

Brief Biography or CV

Shashi Shekhar is currently a McKnight Distinguished University Professor of Computer Science at the University of Minnesota, Minneapolis, MN, USA. Shashi is a prominent researcher in the area of geographic information systems (GIS) and spatial computing. For outstanding contributions to these areas, he received the IEEE Computer Society Technical Achievement Award and was elected an IEEE Fellow as well as an AAAS Fellow. Shashi also received the University Consortium for GIS Education Award (2015) and also named a key difference-maker for the field of GIS by the most popular GIS textbook¹. He has a distinguished academic record that includes 300+ publications including a popular textbook on Spatial Databases (Prentice Hall, 2003), an authoritative Encyclopedia of GIS (Springer, 2008) and a massively open online course (Coursera, Fall 2014).

Shashi represented² the Computing Research Association in a recent Congressional reception titled “Deconstructing Precision Agriculture” for the house agricultural committee. He also served on the CRA’s Computing Community Consortium Council (2012-15), and multiple National Academies’ committees including Models of the World for USDOD-NGA (2015), Geo-targeted Disaster Alerts and Warning (2013), Future Workforce for Geospatial Intelligence (2011), Mapping Sciences (2004-2009) and Priorities for GEOINT Research (2004-2005). In addition, he served as a general or program co-chair for the Intl. Conference on Geographic Information Science (2012), the Intl. Symposium on Spatial and Temporal Databases (2011) and ACM Intl. Conf. on Geographic Information Systems (1996). Furthermore, he served on the Board of Directors of University Consortium on GIS (2003-4), as well as the editorial boards of IEEE Transactions on Knowledge and Data Eng. and IEEE-CS Computer Sc. & Eng. Practice Board. Currently, he is serving as a co-Editor-in-Chief of Geo-Informatica: An International Journal on Advances in Computer Sciences for GIS (Springer), a series editor for the Springer-Briefs on GIS.

In early 1990s, his research developed core technologies behind in-vehicle navigation devices as well as web-based routing services, which revolutionized outdoor navigation in urban environment in the last decade. His recent research results played a critical role in evacuation route planning for homeland security and received multiple recognitions including presentation in a Congressional breakfast on “GIS and Homeland Security” (2004) as well as the University of Minnesota’s Center for Transportation Studies Partnership Award³ for significant impact on transportation. He pioneered the research area of spatial data mining via pattern families (e.g. collocation, mixed-drove co-occurrence, cascade), keynote speeches, survey papers and workshop organization. He also contributed significantly to the design of the USDOJ CrimeStat 3.0 software, which is used by thousands of police departments, as well as the UMN map server, a forefather of Google Earth, which is used by tens of thousands of web-services (e.g., NASA World Wind) publishing geographic data on the Internet.

¹ P. A. Longley, M. F. Goodchild, et al, Geographic Information Systems and Science, 3rd Ed., Wiley, 2010.

² Capitol Hill Presentation on Deconstructing Precision Agriculture, Computing Research News, 27(4), April 2015.

³ Evacuation project wins award, CTS Report, Center for Transportation Systems, University of Minnesota, May 2006.