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Venu Govindaraju
Vice President for Research and Economic Development
SUNY Distinguished Professor of Computer Science & Engineering
University at Buffalo, State University of New York (SUNY)
http://www.buffalo.edu/cubs/members/venu-govindaraju.html

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Education

PhD	University at Buffalo, State University of New York	1992
	Major: Computer Science (Artificial Intelligence)	
MS	University at Buffalo, State University of New York	1988
	Major: Computer Science	
BTech	Indian Institute of Technology (IIT)	1986
	Major: Computer Science and Engineering	

Key Positions

University at Buffalo, SUNY

Vice President, Research and Economic Development (VPRED)	**9/14 - current**
SUNY Distinguished Professor	11/10 - current
Furnas Chair Professor, School of Engineering and Applied Sciences	6/14 – 8/15
Director, Computational Data Science and Engineering (CDSE)	7/13 – 8/15
UB Distinguished Professor	9/08 – 11/10
Director, UB Strategic Strength in Information Technology	1/07 – 8/15
Director, Center for Unified Biometrics and Sensors (CUBS)	1/04 - current
Professor, Department of Computer Science & Engineering	8/02 - current
Associate Professor, Department of Computer Science & Engineering (tenure)	8/00 – 7/02
Research Scientist, Center for Document Analysis and Recognition (CEDAR)	6/92 – 12/03

Professional Summary

An accomplished academic leader, Venu Govindaraju, PhD, is currently serving at the University at Buffalo, SUNY (UB) as the Vice President for Research and Economic Development (VPRED) with active membership in both the President's cabinet as well as the Provost's leadership council. Govindaraju has established positive and strong working relationships with UB's academic deans to enhance and promote the scholarly and creative work of faculty. He has executed several strategic plans that have advanced the university's mission of creation and sharing of knowledge for broad societal good. His commitment to the mission of public universities and higher education is borne out by his impactful accomplishments in the areas of student success, faculty recruitment and retention, shared governance, student and faculty entrepenurship, interdisciplinary research, community engagement, and administrative efficiencies.

Govindaraju is a SUNY Distinguished Professor and a leading authority in the area of pattern recognition and machine learning (a sub discipline of Artificial Intelligence). He founded and leads a successful multidisciplinary research center (Center for Biometrics and Sensors), which is internationally recognized as one of the top research labs in the field in terms of doctoral students graduated and accolades garnered for several path breaking innovations. He is a recipient of six best paper awards, and has co-authored six books and over 440 refereed publications. He has served on the editorial boards of several premier journals including Editor-in-Chief of IEEE Biometrics Compendium. Recently he also served as the President of the IEEE Biometrics Council. He has been a principal investigator on continuous sponsored funding of nearly $70M over his career.

Govindaraju's role of VPRED at UB calls for frequent engagement with the Chancellor's Office of the State University of New York (SUNY), as well as with counterparts at sister university campuses. Govindaraju's current term on the APLU Council on Research (CoR) Executive committee also provides him the forum for participating in media roundtables and congressional visits to champion the cause of public universities, to put forth the academy's viewpoints, and share best practices across university systems.

Serving as director, Govindaraju is on various boards ranging from community focus (Girl Scouts of Western New York) to scientific focus (Hauptman Woodward Research Institute), to startup companies, and to international institutes. Furthermore, he recently completed a three-year term as President of the IEEE Biometrics Council where the responsibilities included promoting technical activities, sponsoring technical meetings and sessions, publishing periodicals, and promoting educational activities across the globe. He has given over 100 invited talks, including keynotes at prestigious venues and think tanks.

Towards the efforts of globalizing UB, Govindaraju has developed a sustained doctoral students' exchange program and serves on advisory boards of international institutes (IDRBT, affiliated with the Reserve Bank of India). These partnerships and related experiences put him in good stead in addressing the challenges that face higher education where online and international influences have to be part of framing the university's vision. Whereas Govindaraju's emphasis as a research center director was on grooming students for impactful and rewarding careers, his focus as a senior administrator has been on lowering the barriers to success for all stakeholders so that collectively the university community can achieve excellence in scholarship, teaching, and engagement across society.

Awards & Honors

- ***Fellow of the AP Academy of Sciences*** (2016).
- *Excellence in Graduate Student Mentoring Award*, University at Buffalo, SUNY (2016)
- ***Fellow of National Academy of Inventors*** (2015).
- *ICDAR Outstanding Achievements* (2015), "For pioneering contributions to pattern recognition".
- *Distinguished Alumnus Award* (2014), Indian Institute Technology Kharagpur, India.
- ***Fellow of SPIE –*** Society for Optics and Photonics (2013), "For contributions to Biometrics".
- ***Fellow of AAAS*** – American Association for the Advancement of Science (2010), "For outstanding contributions in biometrics and document retrieval".
- *IEEE Technical Achievement Award* (2010), "For pioneering contributions to handwriting systems".
- ***Fellow of ACM*** – Association of Computing Machinery, (2009), "For contributions to handwritten document image analysis, recognition, and retrieval".
- *SUNY Chancellor's Award* (2007), "In recognition of outstanding scholarship and creative productivity and significant contribution to institutional quality".
- ***Fellow of IEEE*** - Institute of Electrical and Electronics Engineers, (2006), "For contributions to handwriting recognition".
- ***Fellow of IAPR*** – International Association of Pattern Recognition, (2004), "For contributions to advances in handwriting recognition".
- *MIT Global Indus Technovator Award* (2004), "For pioneering endeavors at the frontiers of technological innovation", MIT Indian Business Club, Cambridge, MA.
- *Business First 40 Under 40 Honoree (2002)*.
- ***Fellow of IETE*** – *Institution of Electronics and Telecommunication Engineers* (2002).
- *IAPR/ ICDAR Outstanding Young Investigator Award* (2001), "For visibly demonstrating the utility of pattern recognition algorithms and for outstanding scientific productivity".

KEY ADMINISTRATIVE ACCOMPLISHMENTS
(2014-20)

I. **Student Success**
- Partnered with the dean of undergraduate education to develop the **experiential learning network** portal; paired local companies in life sciences and materials informatics with students for internships leading to employment upon graduation; launched the e-Law clinic with focus on student and faculty businesses and high-growth ventures
- Supported campus-based program designed to introduce **entrepreneurship as a viable career path** to students via the Blackstone Launchpad initiative which organizes hands on training, business plan competitions (Panasci Tech), startups, networking events, hackathons, and more
- Established an undergraduate **research abroad** summer program that features a personalized matching process between students and research mentors; students are involved in experiential learning, visits to the host country's iconic academic and cultural institutions, presentations and events
- Established a **students-recruit-students** program that allows for undergraduate students to be recruited and mentored solely by graduate students and postdocs to break the false barrier of intimidation and shyness; promotes easy exposure to research on campus and getting questions answered without hesitation
- Established a **shadow alumni** program in partnership with career services that pairs undergraduate students with alumni; students shadow alumni for 1-4 weeks to gain experiential learning of job in the industry; opens avenues for networking and internship and future job prospects
- Oversight of **interdisciplinary programs**: i) Revamping existing bioinformatics undergraduate major (joint between biological sciences and computer science departments); ii) launching of a PhD program in Computational Data Science piggybacking on partner MS departments; iii) development of new graduate certificates in genomic literacy, advanced manufacturing, robotics

II. **Administration Efficiency**
- Chaired university-wide task force on **safeguarding university and faculty assets and interests**
- Established committee on **social equity in research** to promote awareness and bring systemic changes across the research enterprise including recruiting, support, mentoring, and excellence
- Created a Faculty Research Hub for **one-stop faculty support** for pre- and post-award accounting, grant writing, and technology transfer
- **Redefined the roles of staff** to make the units (reporting to VPRED) more efficient, fiscally self-sufficient, and to stay current with the needs of faculty and students and opportunities and challenges presented by the ever-changing research landscape
  - Reorganized Tech Transfer, Sponsored Programs and Services (staff reorganized: 70)
  - Reorganized Research Institute on Addictions to integrate new curricula and clinical services with the research program (staff reorganized: 60)
- Adopted the **Shared Governance** model in the Vice President for Research Office
  - Annual retreat camps held with participation from all the center directors and unit heads to allow free exchange of ideas and transparency on all initiatives
  - Quarterly meetings held with all the associate deans for research of the decanal units (12) to vet new policies, respond to faculty needs, and keep the channel of communications open and effective

III. Recruitment and Retention

- Identified departments and areas that match the university's strategic vision of growth and sustainability to make **high profile hires** under SUNY's Empire Innovation Program
- Advocated (successfully) to the provost to consider engagement and **commercialization activities in faculty promotion dossiers** at par with scholarship
- Appointed three Associate Vice Presidents for Research and over a dozen center directors
- Oversight of recruiting 19 interdisciplinary faculty members under the RENEW initiative in Environment, Water, Energy, and Sustainability areas
- Chaired search committee to **hire over 25 interdisciplinary faculty** members across decanal units as the director of centrally funded initiatives for building strategic strengths on campus
- Established best practices guidelines to **ensure diversity and inclusion** in the recruiting process by persistent messaging, vigilant monitoring, and ensuring diversity in hiring pools
- Collaborated with the provost's office in **retaining several high profile faculty** on campus with funding for labs, instruments, postdocs, and more

IV. Inter-disciplinary Research

- Established a $3M fund to support the **Buffalo Blue Sky** program that offers just-in-time seed funding for investigator-led, multidisciplinary research to solve large and complex problems
- Established over a dozen **new research centers** to support star researchers and faculty clusters; launched the Buffalo AI Institute with initial focus on medicine, health, and autonomous vehicles
- Leadership on **$30M University investment** in the Communities of Excellence to address societal challenges on renewable energy, advanced manufacturing, global health, and precision medicine; supported core faculty strengths as well as new faculty hires to fill gaps and further strengthen areas
- Exceeded $412M annual research expenditures on NSF Higher Education Research and Development (HERD) Survey; achieved more than **20% rise in sponsored research** in 5 years
- Awarded **large competitive research centers** with multi-year funding:
  (i) NNSA Center for Exacale Simulation of Hybrid Rocket Motors - $8.5M
  (ii) NSF Science and Technology Center on Biology with X-Ray Free Electron Lasers - $23M
  (iii) New Drug Discovery Center to move PI's targets to commercialization - $35M
  (iv) NYSTAR CAT matching funds to support industry R&D in big data and health- $10M
  (v) NY State Innovation Hub for technology commercialization and incubation space - $32M
  (vi) NIH Clinical and Translational Science Award (CTSA) - $15M; $23M renewal awarded
- **Accreditations** from AAHRPP (Association for the Accreditation of Human Research Protection Program) and AAALAC (Association for Assessment and Accreditation of Laboratory Animal Care)

V. Commercialization and Economic Development

- Created UB **SWIFT program** to reduce transaction time with industry (and eliminate lengthy, costly negotiations) by empowering both parties to set licensing terms at the project planning stage
- Created incentive plan to **stimulate industry engagement**; underline research relevance, generate student internships; quadrupled SBIR/STTR projects; 4 companies licensed UB technology
- Connected dozens of **incubator companies with UB talent** via internships, competitions, consulting opportunities, speaking engagements, and enhanced career fair opportunities; new wave of startups (over 60) co-located on university campus and incubators
- Enabled partner companies to **create over 1500 jobs** in western NY over four years

I. ADMINISTRATIVE EXPERIENCE

1) **Vice President for Research and Economic Development (VPRED)**
   (Sept 2014 – current)

   VPRED is key to the university's strategic plan for becoming a model 21st-century institution among the nation's highly ranked public research universities. The mission is to

   - *Advance* the research enterprise at UB
   - *Encourage* entrepreneurial enterprise and facilitate innovative thinking
   - *Provide* a supportive infrastructure for scholarship, creative activities, research compliance, innovation and technology transfer

   ❖ *Representing UB*

   - Senior Leadership Representative at the National Forum for Competitiveness
   - Active participation in AAU Research Officers and APLU Council on Research
   - Elected to the Council of Research executive committee (2018)
   - Active participation in Congressional visits to Senators and Representatives
   - Senior Leadership Representative at the National Cyber Security Summit, Huntsville, AL
   - Senior Leadership Representative at the Universities Research Association (URA) Council of Presidents, Washington DC
   - Board of Directors, Hauptman-Woodward Medical Research Institute, Buffalo NY
   - Board of Directors, Empire Discovery Institute, NY

A. Leadership

The VPRED supervises the following units, centers, and communities. While the office units has nearly 140 staff, the total number of members when including all the research centers as well is closer to 200. The operating budget of the OVPRED is approximately $50M. Supervision of these units includes all administrative decision making such as budget allocation, discretionary salary increases, hiring, appointment of new leadership, space management, and other operational matters.

❖ *Office Units*

- **Business and Entrepreneur Partnerships** (BEP, staff: 25)
     Bridge research and economic development on campus

- **Clinical Research Office** (CRO, staff: 20)
     Office charged with administrative oversight for all clinical research activities at the university

- **Comparative Medicine Laboratory Animal Facilities** (CM-LAF, staff: 13)
     Centralized service responsible for the animal care-and-use program campus wide

- **Office of Research Advancement** (ORA, staff: 10)
     Help faculty create highly competitive proposals to support research and advance UB initiatives

- **Office of Research Compliance** (ORC, staff: 17)
  Oversight of Institutional Review Board, Institutional Animal Care and Use, financial conflicts of interest, responsible conduct of research and export controls

- **Electronic Research Administration** (ERA, staff: 4)
  Provide integrated information services, resources and technologies to the UB community

- **Social and Behavior Research Support Office** (BRO, staff: 1)
  Support investigators who conduct studies in non-clinical areas

- **Sponsored Projects Services** (SPS, staff: 40)
  Submit proposals for funding, provide stewardship of awarded funds, and ensure compliance

- **Technology Transfer** (staff: 10)
  Guide researchers as their discoveries and inventions become new products and services

❖ *Interdisciplinary STEM Centers*

- **Artificial Intelligence Institute** (UB.AI)
  Innovative human-machine partnerships in health and autonomous systems

- **Center for Computational Research** (CCR)
  Provide faculty with access to high-performance computing, data, and visualization resources

- **Center for Hearing and Deafness**
  Focus on clinical and research approaches to solve the problems of hearing loss

- **Center for Integrated Global Biomedical Sciences**
  Hub for non-traditional approaches to address regional and global health challenges

- **Clinical Research Institute on Addictions** (CRIA)
  Advance the knowledge of the causes, consequences, prevention, and treatment of substance use disorders

- **Institute for Lasers, Photonics, and Biophotonics** (ILPB)
  Multidisciplinary research in Medicine, Dental Biology, Engineering, Physics and Chemistry

- **NYS Center of Excellence in Bioinformatics and Life Sciences** (CBLS)
  Hub for life sciences innovation and technology based economic development

- **NYS Center of Excellence in Materials Informatics** (CMI)
  Leverage UB's materials science, big data analytics, and advanced manufacturing expertise to impact private sector growth

- **UB RENEW: Research and Education in eNergy, Environment and Water Institute**
  Inter-disciplinary focus on energy and environmental issues and their social and economic ramifications

- **UB Microbiome Center**
  Conduct research to improve health care, boost food production and restore the environment

❖ *Non-STEM Centers*

- **Creative Arts Institute** (CAI)
  Dedicated to the creation and production of new work upholding the highest artistic standards of excellence and fostering a complementary atmosphere of creative investigation and engagement among students, faculty, visiting artists, and the community

- **Humanities Institute** (HI)
  Provide a forum for conversations among humanists of all disciplines to question, comprehend, and transform an increasingly complex world

❖ *Collaborative Research*

- **Biology with X-ray Free Electron Lasers** (BioXFEL) - A NSF Science and Technology Center
  Enhance our understanding of molecular machines

- **Buffalo Institute for Genomics & Data Analytics** (BIG)
  Transform genomic medicine nationally while building the healthcare economy regionally

- **Clinical Translational Research Center**
  Improve health and reduce health disparities in our community

- **START-UP NY**
  Giving companies the opportunity to operate state and local tax-free on (or near) a UB campus

- **UB CAT: Center for Advanced Biomedical & Bioengineering Technology**
  Focus on the intersection of big data and health sciences, particularly as it relates to drug development, medical devices, diagnostic tools and healthcare IT

- **UB Incubators**
  Support the creation of new companies by providing affordable business services to entrepreneurs

- **WNY Innovation Hot Spot**
  Help incubator ventures grow quickly, achieve greater profitability, and become more attractive to investors

❖ *Communities of Excellence*

- **Genome, Environment and Microbiome** (GEM)
  GEM community is advancing genomic science and increasing genomic literacy through research, education and community outreach. This collaboration among the sciences, social sciences, arts and humanities will empower all people in society's shift to more personalized medicine.

- **Sustainable Manufacturing and Advanced Robotic Technologies** (SMART)
  Partnering with area companies in advanced manufacturing and design to help shape education and national policy, the SMART Community focuses on next generation technologies and processes for customizable production.

- **Community for Global Health Equity** (GHE)
  GHE is focused on the social, economic, political and environmental factors that contribute to global health inequities. Its aim is to influence policymakers, funders and practitioners in addressing problems ranging from child survival, growth and development to refugee health and wellbeing.

B. Responsibilities

❖ *Scholarly Excellence*

Advance research and creative activities in response to the challenging societal problems of our times.

- *Identify* promising new projects to seed and stay ahead of the curve
- *Conduct* internal competitions for limited submission calls
- *Pursue* suitable funding opportunities in industry, government, and philanthropy
- *Provide* comprehensive administrative and technical assistance to develop proposals
- *Support* proposal development, review and submission
- *Manage* research awards for the life of the project
- *Forge* strategic partnerships with institutions and investigators
- *Provide* shared equipment and facilities to the research community
- *Enhance* and maintain a rich IT infrastructure in support of faculty grants activity
- *Communicate* results, expertise and stories to multiple audiences and stakeholders

❖ *Economic Development*

Transform the economies of Buffalo Niagara, New York State and beyond by helping UB achieve its full impact as a major economic engine.

- *Bridge* research and economic development by leveraging the knowledge, resources and expertise necessary for an innovation economy
- *Create* regional attraction for the US workforce to locate in western New York
- *Connect* businesses with university resources and facilities
- *Engage* entrepreneurs and facilitate entrepreneurial ecosystems
- *Disseminate* information for economic development agencies
- *Advocate* for technology that can be licensed by entrepreneurs and companies
- *Encourage* and *reward* invention, collaboration and community
- *Assist* with technology transfer, licensing, and commercialization
- *Protect* UB intellectual property (IP)
- *Manage* royalty distributions
- *Handle* transfer disclosure and non-disclosure agreements
- *Take* UB research from lab to market and assist with all the opportunities in between
- *Support* start-ups that locate in in western New York
- *Innovate* for business growth particularly in the western New York region
- *Develop* workforce that connects industry with student interns and talented graduates

- *Conduct* employee training workshops to enable industry workforce to stay current
- *Develop* consultation and support programs for businesses

❖ *Compliance in a Regulatory Environment*

Provide administrative oversight for all research activities of the university's faculty members.

- *Facilitate* compliant, meaningful research within the institution
- *Unify* policies governing research conduct across all university schools and departments
- *Be cognizant* of all policies from sponsoring agencies
- *Implement* federal regulations and university guidelines
- *Provide* tools, systems and processes for maintaining research compliance
- *Negotiate* contracts to establish the legal parameters of an agreement
- *Develop* budgets to schedule and identify the charges to be assessed to a funding entity
- *Assist* protocol development for submission to the Institutional Review Board (IRB)
- *Review* clinical research studies for operational feasibility
- *Offer* wide range of pharmacy related services for investigators and staff
- *Protect* human subjects in clinical, social and behavioral research and clinical trials

❖ *University's Research Centers and Institutes*

Academic, discipline-based research is key to the university's mission. Interdisciplinary research centers expand on that mission by addressing societal issues and new learning from multiple perspectives.

- *Formulate* policies for creating interdisciplinary center
- *Conduct* annual internal review and periodical external review of center
- *Appoint* leadership for certain centers based on strategic considerations
- *Conduct* external searches and hiring at all levels
- *Make* the case for annual allocations to the Central Financial Planning

❖ *Annual Resource Planning Process* (ARPP)

ARPP is a framework to review UB's financial capacity, evaluate current activities and identify and assess potential areas for new investment that continue to elevate the university.

- *Provide* inputs to the Senior Leadership annually to enable a predictable and transparent planning process
- *Propose* and justify resources to support Research Administration Infrastructure including investments to advance university and unit strategic goals
- *Make the case* for additional recurring and non-recurring funds based on emerging needs

❖ *Fundraising*

The "Campaign for UB" (Boldly Buffalo, 2018) seeks to raise $650 million to deliver transformative changes for the public research university, Western New York and the world".

- *Support* the University Advancement Office in its philanthropic and development efforts

- *Cultivate* high profile alumni to partner in the vision of UB
- *Spread* the word about the campaign, encourage participation, and thank those who contribute

❖ *Capital Planning*

Member of the capital planning committee which works as an internal team and together with external partners as necessary to achieve effective capital plan implementation.

- *Guide* long-range campus development, including buildings, land use, and capital infrastructure
- *Initiate* strategic efforts required to implement the comprehensive physical master plan
- *Make* recommendations regarding the university's capital plans and priorities

❖ *Student Experience*

Provide experiential learning outside the classroom under the undergraduate scholars program.

- Program supports students during summer to conduct research at Cambridge University
- Encourages students' postgraduate pursuit, cultural mixing and international experience

❖ *Transparency and Shared Governance*

The authority for major changes and new initiatives in the university's research enterprise rests with the VPRED strategic group chaired by the VPR. The group includes the associate vice presidents, the unit chief of staff and the unit financial officer.

- Annual retreat camps held with participation from all the center directors and unit heads reporting to the VPRED to allow free exchange of ideas and transparency on all initiatives

- Quarterly meetings held with all the associate deans for research of the decanal units (12) to vet new policies, respond to faculty needs, and keep the channel of communications with the academic mission of the university open and effective

C. **Accomplishments**

❖ *Center Scale Awards*

- National Institute of Health (NIH), Clinical and Translational Science Award (CTSA) - $23M (2019-23)

- National Science Foundation (NSF) Science and Technology Center (STC) on Biology with X-Ray Free Electron Lasers (BioXFEL) - $23M (2018-22)

- New Drug Discovery Center (EDI) to support moving PI's drug targets to proof of concept in animals and then to commercialize - $35M (2018-24)

- Awarded NYSTAR matching funds to support industry R&D with faculty in area of big data and health- $10M over 10 years (2018)

- Innovation Hub Commercialization for technology commercialization fund, programs and experts in commercialization and incubation space - $32M (2018-22)

- Awarded NFS I-Corps grants to PI's to support customer discovery - $0.5M (2017)

- National Institute of Health (NIH), Clinical and Translational Science Award (CTSA), $15M (2014-18)

❖ *Faculty Recruiting*

Empire Innovation Program (EIP) is a SUNY-funded grant program dedicated to recruiting and retaining world-class faculty at the State University of New York. On behalf of the provost's office, the VPRED chairs an *ad hoc* committee annually to identify the departments and areas that match the strategic vision of growth and sustainability at UB.

- $1M to add faculty in Neurogenetics and Next Generation Therapeutic Proteins in the School of Pharmacy (2017-18)

- $1M shared with (Stony Brook University) for recruiting to meet NY State's clean energy goals (2017-18)

- $3M to add faculty researchers who will build upon the university's existing expertise in artificial intelligence and robotics (2016-17)

- $1M to add faculty researchers in the field of systems pharmacology (2016-17)

- $0.5M to add faculty researchers to the National Science Foundation-funded BioXFEL a research consortium led by UB that focuses on cutting-edge X-ray laser science (2016-17)

- $1M to add faculty in the newly formed Biomedical Engineering department (2015-16)

- $1.3M to recruit faculty to the newly launched RENEW Institute (2015-16)

2) **Director, Computational Data Science and Engineering**
   (August 2013 – July 2015)

- Engaged 24 interdisciplinary faculty from 7 departments

- Hired 9 new faculty in 3 schools
   - School of Engineering and Applied Sciences
   - College of Arts and Sciences
   - School of Management

- Launched a fully functional PhD program in Computational Data Science
   - Designed for students who already hold a Masters' degree
   - Admitted 7 PhD students in 2016
   - Three core areas: Numerical analysis, Data Sciences, High Performance Computing

- Framed a MS program that launched in 2018

3) ***Director, Information and Computing Technology (Strategic Strength)***
   (August 2007 – July 2015)

- Engaged actively with 25 interdisciplinary faculty from 10 different departments

- Hired 13 new faculty across 3 schools
  - School of Engineering and Applied Sciences
  - College of Arts and Sciences
  - School of Management

- Resulted in over a dozen multi-disciplinary, multi-investigator research projects

❖ *Hiring Upper Management Staff*

Responsible for filling four Associate Vice President (Research and Economic Development) positions, and over a dozen center director and office lead positions.

- Created the following positions and made inaugural appointments: Senior Associate Vice Presidents for Research and Operations, ii) Associate Vice President for Research Advancement Management, and iii) Associate Vice President for Economic Development.

- Formed the appropriate search committees and charged the chairs of these committees with making recommendations for appointment with full cognizance of the university's unstinted *Commitment to Diversity and Inclusion.*

- Appointed the directors of the following centers in 2014-18:
  i) AI Institute, iii) RENEW Center, ii) NYS Center of Excellence in Materials Informatics, iii) NYS Center of Excellence for Bioinformatics and Life Sciences, iv) Center for Computational Research, v) Clinical Research Office, vi) Office of Research Compliance, and vii) Animal Lab Facilities.

❖ *New Initiatives*

- Launched the "Buffalo Blue Sky" to offer just-in-time seed funding for investigator-led, multidisciplinary research that pushes the boundaries to solve large and complex problems in any domain (2018).

- Created a Faculty Research Hub for one-stop faculty support for pre- and post-award management, grant writing, financial reporting, and technology transfer (2016).

- Created *UB SWIFT* program to reduce transaction time with industry (and eliminate lengthy, costly negotiations) by empowering both parties to set research and licensing terms at the project planning stage (2016).

- Launched the Faculty Consulting program to stimulate industry engagement (2016).

- Launched the university SBIR/STTR support to stimulate industry engagement (2016).

❖ *Creation of New Centers*

- Established the *Center for Ingestive Behavior Research* to study the physiological, nutritional, developmental, genetic, sensory, and socio-economic determinants of food and fluid intake

- Established the *UB Artificial Intelligence Institute* to foster research in human-machine partnerships with focus on health and autonomous systems (2018)

- Launched the *UB Microbiome Center* to conduct research on the human microbiome, the collective microorganisms that live on and in the human body. The goal of research conducted at the center is to develop a base of knowledge about the human microbiome and its role in health and disease (2016)

- Launched the *UB Center for Integrated Global Biomedical* Sciences that uses education, training and research to promote novel discovery, maximize technology and foster translation. It works with international partners in addressing global health challenges and in recognizing the important connections between health and sustainable economic development (2016)

- Formalized the *Office of Research Advancement (ORA)* to support the university's research and scholarly community in the pursuit of external grant and research funding. Comprehensive administrative and technical support are available to researchers as they form their research teams, identify collaborators, refine their projects and develop their proposals. (2016)

- Launched the university-wide clinical research office under joint supervision with the Vice President of Health Sciences (2015)

- Launched and oversee *Communities of Excellence* - $10M (2015-19).
  - Global Health Equity: interdisciplinary approach to better promote the health and well-being of under-resourced populations
  - Sustainable Manufacturing and Advanced Robotic Technologies: leverage UB and regional strength in manufacturing, partner with regional companies
  - Genome, Environment, and Microbiome: advance genomic science and increase genomic literacy through research, education and community outreach

- Launched and oversee Research and Education in Environment, Energy and Water (RENEW) Institute - $3M/year

- Launched the *Creative Arts Institute* for creation and production of highest artistic standards -$1M (2015-19).

❖ *Accreditation*

UB follows rigorous standards for ethics, quality, and protections for human research and promotes humane and responsible research animal care.

- AAHRPP: Association for the Accreditation of Human Research Protection Program (2018)

- AAALAC: Association for Assessment and Accreditation of Laboratory Animal Care (2018)

❖ *Implementing Positive Change*

Reorganized units (Tech Transfer, Sponsored Programs and Services, Research Institute on Addictions) and redefined the roles of staff to make the units more efficient, fiscally self-sufficient, and to stay current with the needs of faculty and students and opportunities and challenges presented by the ever-changing research landscape.

❖ *Community Engagement*

- Genome Day – annual event organized by VPRED brings about 400 8th graders from the Buffalo Public Schools, to the medical campus to learn about genetics/genomics.

- Co-Organized Health Sciences Symposium which brings 120 high school juniors from the Hamburg, Lancaster and West Seneca Health and Life Sciences Academies

❖ *Entrepreneurial Programming*

Awarded a NSF funded program that assists researchers by evaluating their technology's market fit and provides resources to teams in the form of seed funding, entrepreneurial mentoring, curriculum, or other assets needed to transition ideas and technology into the marketplace. Through the WNY Innovation Network, a consortium of ten incubators across WNY region:

- Connected dozens of incubator companies with UB talent via internships, competitions, consulting opportunities, speaking engagements, and enhanced career fair opportunities

- Certified 22 incubator clients to leverage NYS Innovation Hot Spot tax incentives, adding money back to their balance sheets to fuel additional growth

- Paired 27 incubator clients with outside experts to lead them past milestones in their scalable development through our Embedded Consultants program

- *Launched* Buffalo Student Sandbox – WNY's first accelerator program – to help more than 40 teams of disruptive student entrepreneurs take giant leaps forward

- *Piloted* and expanded "Inclusive Launch", a first of its kind diversity outreach program that provides crucial learning opportunities for underrepresented students while also providing incubator ventures with vital infusions of diversity

D. Performance Metrics

UB ranked as the top public research university in New York State on the NSF Higher Education Research and Development (HERD) Survey; while maintaining its position in the nation's top 60. Its annual research expenditures topped $400M in 2018.

II. CURRICULUM VITAE

A. Publications

❖ **Best Paper Awards (7)**

1. ICDAR Best Student Paper Award, (Fei Xu) Sydney, Australia, 2019
2. CBDAR Best Paper Award, Sydney, Australia, 2019
3. Data for Development Challenge, National Statistics Prize (Neeti Pokhriyal), Boston, 2015
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B. Technical Impact

❖ **Architected an early AI success story** by making postal address recognition and deployment of engineered systems (via Lockheed, 1997-2001) a reality, saving the postal services of US, UK, and Australia, hundreds of millions of dollars[1] [2].

- Govindaraju's seminal work in handwriting recognition[3] was at the core of the first handwritten address interpretation system used by the U.S. Postal Service. It uses an innovative dynamic matching algorithm to assign automatically segmented pieces of words to lexical entities. This simple but powerful idea enabled real-time handwriting recognition by overcoming the challenge of dealing with large lexicons.

- Govindaraju developed the approach of "active recognition" which is modeled along the lines of the A* algorithm. It provides a multi-resolution framework for adapting to factors such as the quality of the input pattern, its intrinsic similarities with patterns of other classes, and the

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[1] The Government Executive publication reported in 1999 that "USPS issued a contract to researchers at the State University of New York at Buffalo to develop the handwriting recognition technology. It was first launched in 1997 right before the Christmas holiday season. One year later, an estimated 400 million pieces of mail were automatically routed during the Christmas season alone using the handwriting recognition technology. The new technology has saved the Postal Service at least $90 million in its first year in the field."

[2] Computing Community Consortium (http://www.cra.org/ccc/) refers to the seminal work:
  - March 25, 2009: **Computing Research that Changed the World: Reflections and Perspectives**, "… Automated handwriting analysis seems easy but there are many ways to write each number or letter. **Using a learning-based system developed at UB by Venu Govindaraju and colleagues, 25 billion letters a year are processed automatically by the US postal service -bar-coded for precise delivery- saving hundreds of millions of dollars**…" (Presentation by Daphne Koller).
  - June 7, 2016: AI for public good: "**An early success story in the 90s widely considered the winter of AI**" (Presentation by Eric Horvitz).

[3] US 5,515,455: "System for recognizing handwritten words of cursive script", V. Govindaraju; D. Wang; and S. Srihari, 1996.

processing time available. This provides the knobs to engineered real-time systems to tradeoff accuracy and speed in a cost-benefit framework, which enabled postal services to gradually trim down the need for human data entry operators and thereby increase efficiencies and grow savings.

❖ **Pioneered automation of (multilingual) handwritten documents processing** by (i) improving efficiencies of document work-flow in large organizations using innovative handwriting recognition solutions (Emergency Medical Response 2004, NYS Department of Health 2007, Medical Management Research Network 2009); (ii) developing script and language-independent techniques for data-driven re-targetable recognition systems (DARPA MADCAT 2009-2013); and (iii) development of digital archives and transcription tools (International Sanskrit Digital Library, 2008; Marian Moore Digital Archive, 2016).

   • Departing from the myriad heuristic approaches, he introduced a principled statistical approach by modeling the degraded document as a Markov Random Field where the prior is learned from a training set of high quality images, and the probabilistic density is estimated on-the-fly. This approach proved to be critical in dealing with poor quality scanned forms and faxed prescriptions, thus contributing to improved health care due to decreased human error in medical transcription.

   • Through his landmark paper on Arabic script recognition, the first comprehensive book on OCR of Indic Scripts, and other publications, he demonstrated novel recognition driven methodologies that steer away from prior approaches that primarily used sequential rules to segment characters and lines. This paved the way for successful deployment of the DARPA Multilingual Automated Document Classification, Analysis, and Translation (MADCAT) system for generating real-time actionable intelligence using multilingual recognition capabilities. A direct consequence of this effort is the empowerment of people working and collaborating across language barriers.

❖ **Major impact on the human language interface** to websites and hand-held devices, engaging with users on their terms (i.e., language), contributing to the ease of use and ubiquity of today's technologies.

   • Govindaraju developed a new stochastic framework that combined discrete symbols and continuous attributes and incorporated the theories of reading and perception developed in psychology literature in analyzing handwritten words. This led to the innovative spambot-fighting strategy using simulation of human-like handwriting for designing *captchas* to exploit the differential in handwriting reading proficiency between humans and machines.

   • Govindaraju proposed that, although handwriting is unique to writers, writer style represents a shared component of individual handwriting. He explicitly models this conceptualization via a three-level hierarchical Bayesian framework for the purposes of writer identification and verification. In this text-independent model, each writer's handwriting is modeled as a distribution over a limited set of writing styles that are shared amongst writers. Analogous to speech, accents in writing are treated as distinctive quirks unique to a group of people belonging to a common family of scripts, which have roots in cultural and genetic factors. This paved the way to personalization of handwriting stylus input as a viable alternative to keyboard and speech in mobile devices.

❖ **Key early consulting role in the world's largest biometric ID system, Aadhar** (over 1 billion enrolled

participants in India) used extensively for the delivery of government services, empowering residents of India with a unique identity and digital platform to authenticate anytime, anywhere.

- Govindaraju's highly innovative work in securing biometric templates using symmetric hash functions and convolving multiple biometric modalities where one biometric provides the encrypting basis for another was proposed for integration to Aadhar. He has also shown theoretically, why random projections are an essential step in cancelable biometrics by defining the notion of an Independent Subspace Structure for datasets, and demonstrating that random projection preserves the subspace structure of data vectors generated from a union of independent linear subspaces.

- Govindaraju proved that the optimal combination (fusion) algorithm for identification systems is difficult to express analytically because of the difficulty presented by the dependencies between matching scores assigned to different classes by the same classifier. He developed the first taxonomy of the complexity of classification combination methodologies and a guideline for choosing a particular type of fusion technique. Thus, rival vendors reluctant to share the inner workings of individual classifiers are able to join forces on a common platform for improved performance.

❖ *Scholarship Impact*

- Research reported in prestigious technical media outlets
    - Scientific American- March'12
    - ACM Tech News- October'10, September'07, January'05
    - MIT Tech Review, January'09, October'09.

- **450 refereed publications**
- **15,000 citations**
- **h-index: 62**

- 44 PhD students supervised as Major adviser
- 17 MS students supervised with thesis option
- Over 200 graduate students advised on various projects

❖ *Patents*

1. US 8,005,277: "Secure fingerprint matching by hashing localized information", S. Tulyakov; F. Farooq; S. Chikkerur; and V. Govindaraju, 2011.
2. US 7,689,006: "Biometric convolution using multiple biometrics", V. Govindaraju; V. Chavan; and S. Chikkerur, 2010.
3. US 7,580,551. "Method and apparatus for analyzing and/or comparing handwritten and/or biometric samples", S. Srihari; V. Govindaraju; et. al. 2009.
4. US 5,515,455: "System for recognizing handwritten words of cursive script", V. Govindaraju; D. Wang; and S. Srihari, 1996.

C. Grants & Research Projects Support

Total Funding: $68.3M

Projects	Government	PI : V. Govindaraju	Awards	Period
Center for Identification Technology Research (CITeR)	National Science Foundation (NSF)	Setlur, Nwogu	$428,382	2018-22
CITeR	Dept. of Homeland Security (DHS)	Setlur	$96,650	2019-20
Data Laboratory for Materials Engineering	NSF	Setlur, Rajan, Furlani	$2,909,772	2016-20
Janus - Face Recognition	Intelligence Advanced Project Activity (IARPA)	Setlur	$1,300,000	2014-18
Long term active authentication using multi- modal user profiles	NSF	Setlur, Upadhyaya, Inwogu,	$1,200,000	2013-16
Center for Identification Technology Research (CITeR)	NSF	Setlur, Nwogu	$300,000	2013-18
CITeR	DHS	Tulyakov	$259,476	2013-20
CITeR	National Security Agency (NSA)	Rudra	$80,000	2013-15
Planning I/UCRC Grant	NSF	Setlur	$12,997	2012
Privacy Preserving Biometric Templates & Efficient Indexing	NSF	Rudra	$514,788	2011-14
Identifying Accents in Handwritten Scripts	NSF		$150,000	2010-12
Transcript Mapping in Indic Scripts	NSF		$94,234	2008-10
Health Card Biometrics	NYSTAR: NY Science & Technology Advanced Research		$25,000	2008
Multilingual Document Classification	Defense Advanced Project Agency (DARPA)	Setlur	$3,277,393	2007-13
Person Specific Behavioral Dynamics	NSF	Frank	$852,649	2007-10
Sanskrit Digital Library	NSF		$202,888	2005-08
Advanced Biometrics	Dept. of Defense (DoD)	Moskal	$1,585,884	2005-07
Multimodal Biometric Systems	Army Research Labs (ARL)		$265,714	2004-06

Disease Surveillance Informatics	NSF	Setlur	$450,000	2004-08
Arabic Handwritten OCR	Directorate of Central Intelligence		$240,000	2004-06
Smart Card Biometrics	NYSTAR		$100,000	2004-05
Automation of Medical Forms	NSF		$50,000	2003-04
Cognitive Recog Models	NSF		$99,731	2002-03
Devanagari OCR	NSF		$487,319	2002-04
Total Federal/State Funding			**$14,902,575**	
CITeR	Zoloz	Setlur	$80,000	2017-19
Preparation of Data Sets	Lockheed	Setlur	$130,000	2014-15
Automated Package Processing System (APPS)	Lockheed	Setlur	$54,571	2013-14
CITeR	Qualcomm	Setlur	$270,000	2013-19
CITeR	Raytheon BBN	Setlur	$80,000	2013-15
CITeR	CUBRC	Setlur	$40,000	2013-14
ML in NLP	Digiliant		$30,000	2012-13
Scene Text OCR	eBay		$50,000	2012-13
Handwriting Datasets	Google		$50,000	2012-13
Soft Biometrics	CUBRC		$200,000	2011-12
Machine Learning	Fujitsu		$55,000	2011
Pen, Touch, and Hand Gestures	HP Labs	Corso	$150,000	2008-10
Processing Hand-Annotated Documents	HP Labs	Setlur	$185,000	2008-11
Smart Card Biometrics	Health Networks		$75,000	2008
GUI for DAQ	ACIS	Setlur	$40,000	2008
Barcodes project	Matrix	Setlur	$161,663	2008-10
Arabic OCR	Aplied Media Analysis		$150,000	2008-10
Document Classification	Copanion		$20,000	2007-08
Student Doctoral Fellowship	IBM		$55,314	2007-09
RCR Truthing	Lockheed	Setlur	$1,094,900	2007-14
Behavioral Dynamics	CUBRC		$31,000	2007
NY State Medical Forms	Buffalo Graphics		$60,000	2005-07
Information Retrieval for HW Documents	Google		$50,000	2005-06
Biometric Fusion	CUBRC		$25,000	2005
Friction Ridge Analysis	CUBRC		$25,000	2005-06
Face Recognition	CUBRC		$25,000	2005
Multimodal Biometrics	CUBRC		$25,000	2005

CAPTCHAS for Web Security	CUBRC		$25,000	2004-05
Smart Card Biometrics	U-Scan		$50,000	2004
Biometric Access Control System	International Graphics Inc.		$235,000	2003-04
Automatic Fingerprint Identification Systems	Ultra-Scan	Bartnik, Setlur	$1,246,333	2002-05
Medical Forms Reading	CUBRC		$25,000	2003-04
Forms Reading	CUBRC		$25,000	2003-04
Biometrics	CUBRC		$5,000	2003-04
HWAI Plus	Siemens	Srihari	$317,000	2002-03
Parcel Recognition	Siemens	Srihari	$90,000	2002
Student Support Fellowship	IBM		$21,000	2001-02
Canadian Postcode Interpretation	Siemens	Srihari	$50,000	2000-01
Handwritten Address Interpretation	Siemens	Srihari	$300,000	2000-01
Canadian Postcode Recognition	Systems House Ltd.	Srihari	$10,000	1994
Recognition of Hand Printed Forms	Readers Digest	Srihari	$10,000	1994
Document Analysis and Recognition	Xerox	Srihari	$70,000	1993-00
Total Industry Funding			**$5,691,781**	
Total Funding as PI			**$20,594,356**	
Non-Postal Funding as Co-PI				
Odor Typing for Disease Detection	Oishei Foundation	Bright, Cartwright,	$400,000	2006-07
The LitGloss Project	National Endowments for Humanities (NEH)	Jameson	$196,938	2003-05
Unobtrusive Biometrics Systems	NYSTAR	Bright, Titus,	$153,360	2003-04
Handwritten Text Recognition	NSA	Chin,	$532,939	1994-96
Handwriting Individuality	National Institute of Justice (NIJ)	Shin, Srihari	$428,328	1999-00
Total Funding as Co-PI (Non- Postal)			**$1,711,565**	

Govindaraju Co-PI	Postal	PI		
IES Enhancements, Test Decks, Truthing	USPS	Setlur	$398,000	2015-16
Image Scoring Perf Eval APBS Program	USPS	Setlur	$31,697	2014-15
Flats RECO 2	USPS	Setlur	$40,081	2014-15
Prep of TD14 Test Deck for Comp Eval DQI Recognition Program	USPS	Setlur	$254,368	2014-15
Perf Eval for DQI Recognition Program	USPS	Setlur	$309,701	2014-15
Cancellation Mark Readability Support	USPS	Setlur	$26,974	2013-14
DQI TD13 Test Deck Creation Support	USPS	Setlur	$249,283	2013-14
Evaluation of Flat Mail Recognition Improvements	USPS	Setlur	$42,987	2013-14
Image Scoring and Evaluation Support (APPS)	USPS	Setlur	$77,897	2012-13
Test Deck Truthing, RCR Support	USPS	Setlur	$349,971	2012-13
Performance Evaluation DQI	USPS	Setlur	$1,170,215	2009-11
APBS Parcel Projects	USPS	Setlur	$96,373	2010-11
FRIP and FSS Recognition	USPS	Setlur	$354,000	2009-10
Comparative Evaluation DQI	USPS	Setlur	$46,051	2009-10
IES and Truthing	USPS	Setlur, Srihari	$401,511	2008-09
Flats Image Collection and Truthing	USPS	Setlur, Srihari	$810,664	2008-09
Image Evaluation	USPS	Setlur, Srihari	$273,116	2008
Flats Image Collection and Truthing	USPS	Setlur, Srihari	$1,950,533	2003-08
Digital Camera use in Barcode Imaging	USPS	Setlur, Srihari	$409,867	2003-07
Image Collection and Truthing	USPS	Setlur, Srihari	$4,368,541	2003-08
Alternate Keying Strategies	USPS	Srihari	$165,000	2004-05
Reply Card Scanning	USPS	Srihari	$210,000	2003-04
Personal Name Lookups	USPS	Setlur, Srihari	$166,000	2003
Comparison Study of Barcodes	USPS	Setlur, Srihari	$470,000	2003-05
UK Address Interpretation Project	Lockheed	Setlur, Srihari	$15,000	2003
Image Evaluation System-Flats	USPS	Setlur, Srihari	$340,000	2002-03
Micropayment Processing	USPS	Srihari	$1,204,000	2001-03
Mailpiece Library	USPS	Setlur, Srihari	$190,000	2002

Evaluation of ID Codes	USPS	Srihari	$133,000	2001
Return Merchandise System	USPS	Bartnik, Srihari	$300,000	2001-02
Image Evaluation System	USPS	Setlur, Srihari	$1,850,583	1999-03
Information Based Indicia	USPS	Srihari	$300,000	1999-01
UK Address Interpretation Project	Lockheed	Setlur, Srihari	$1,245,000	2000-02
RCR/HWAI	Lockheed	Srihari	$660,000	2000-01
Directory Generation	Lockheed	Setlur, Srihari	$44,235	2000-01
Image Truthing	USPS	Setlur, Srihari	$1,102,000	2000-02
Address Interpretation for UK	Lockheed	Setlur, Srihari	$1,224,367	2000
HWAI Control Strategy	Lockheed	Srihari	$129,190	1999-00
PROZE Character Recognition	Lockheed	Srihari	$128,395	1999-00
VRR Word Recognizer	Lockheed	Srihari	$42,590	1999-00
Foreign Address Processing	Lockheed	Setlur, Srihari	$101,417	1999-00
RCR/HWAI Improvements	Lockheed	Srihari	$503,480	1999-00
UKAI Parsing and Resolution	Lockheed	Setlur, Srihari	$152,442	1999-00
HWAI Australian, Release 4	Lockheed	Srihari	$240,000	1999-00
Truthing for RIP	USPS	Setlur, Srihari	$75,000	1999-00
Truthing and Analysis	USPS	Setlur, Srihari	$290,636	1999-00
New Image Evaluation System	USPS	Setlur, Srihari	$395,257	1999-00
Semi-automated Encoding	USPS	Setlur, Srihari	$185,261	1999-00
Sender Information Processing	USPS	Setlur, Srihari	$134,167	1999-00
Equipment Grant	USPS	Srihari	$46,200	1999-00
Travel Grant	USPS	Srihari	$34,103	1999-00
HWAI of Australia, Release 3	Lockheed	Srihari	$218,333	1999
Last Line, Foreign Processing	Lockheed	Srihari	$100,412	1999
Image Processing Functions	Lockheed	Srihari	$69,156	1999
Control Strategy	Lockheed	Srihari	$101,468	1999
Word Recognizer	Lockheed	Srihari	$46,541	1999
New Character Recognition	Lockheed	Srihari	$45,019	1999
HWAI of Australia, PIP -1	Lockheed	Srihari	$230,000	1999
HWAI of Australia, PIP	Lockheed	Srihari	$89,959	1999
Gray Scale Investigation	USPS	Srihari	$790,000	1998-00
Address Truthing Analysis	USPS	Srihari	$1,424,641	1998-00
HWAI Control Structures	Lockheed	Srihari	$79,200	1998-99
Database Enhancement	Lockheed	Srihari	$52,500	1998-99
New Parsing Technique	Lockheed	Srihari	$77,500	1998-99
New Word Recognition	Lockheed	Srihari	$132,000	1998-99
New Character Recognition	Lockheed	Srihari	$88,000	1998-99
RCR/HWAI Improvements	Lockheed	Srihari	$400,000	1998-99
Firm name Recognition	Lockheed	Srihari	$70,738	1998-99
RCR/ HWAI Improvements	Lockheed	Srihari	$568,538	1998-99
Port HWAI to NT	Lockheed	Srihari	$28,586	1998-99

HWAI Recognition Co-	USPS	Srihari	$650,000	1998
HWAI of Australia	Lockheed	Srihari	$1,144,418	1997-98
RCR/ HWAI Integration	Lockheed	Srihari	$1,500,000	1997-98
HWAI PC Integration	USPS	Srihari	$494,924	1997-98
HWAI/RCR Research	Lockheed	Srihari	$550,860	1997
HWAI/RCR	Lockheed	Srihari	$407,686	1997
Directory Compression	USPS	Srihari	$37,959	1997
Image Analysis	USPS	Srihari	$40,722	1997
Evolutionary Computing	USPS	Srihari	$57,410	1997
HWAI PC Porting	USPS	Srihari	$215,497	1997
HWAI/RCR Research	Lockheed	Srihari	$585,924	1996-97
HWAI/RCR Integration	Lockheed	Srihari	$596,474	1996-97
HWAI PC Integration, Task 1	USPS	Srihari	$255,076	1996-97
HWAI Integration Testing	USPS	Srihari	$99,750	1996-97
Improvements in HWAI	USPS	Srihari	$2,510,680	1993-96
Reply Card Processing - Phase III	USPS	Srihari	$1,388,534	1995-96
Reply Card Processing PIMS	USPS	Srihari	$1,435,416	1993-95
Interactive Service Research	USPS	Srihari	$1,299,519	1993-96
Supplemental Activities	USPS	Srihari	$750,000	1991-95
HWAI Research	USPS	Srihari	$3,256,837	1991-94
Total Postal Funding Co-PI			**$45,909,105**	
TOTAL FUNDING (PI /Co-PI)			**$68,214,946**	
Postal funding at CUBS	USPS	Setlur	$1.471,794	2016-19

D. Mentorship

Post Doctoral Fellows (5)

2017-20	K. Davila (RIT PhD)	•	Equations OCR and Understanding
2017-18	R. Subramanian (UB PhD)	•	Materials Discovery and Machine Learning
2015-16	Y. Zhou (UB PhD)	•	Deep Learning
2006-07	S. Tulyakov (UB PhD)	•	Fusion of Classifiers
2004-06	L. Lorigo (MIT PhD)	•	Arabic Handwriting Recognition

Major Adviser of Doctoral Students (44)

2021	Kyung Wong Lee	• Wardrobe models for long term re-identification and appearance prediction
2021	Deen Dayal Mohan	• Deep learning applications in infographics
2021	Nagamani Lakshmi	• Modeling local attention and relations for automated facial action unit recognition
2021	Nishant Shankaran	• Fusion of classifier templates
2020	Bhargav Urala *Amazon, CA*	• Lecture Video Summarization by detection and representation of content
2019	Neeti Pokhriyal *Dartmouth College, NH*	• Multiview learning via Gaussian processes with applications in biometrics and sustainability
2018	Neeti Narayanan *Yahoo Research, CA*	• Re-identification for online person tracking using spatio-temporal discrimination
2017	Rathin Radhakrishnan *Qualcomm, NY*	• An adaptive framework for metadata extraction and analysis from documents
2016	Rohit Pandey *Google, CA*	• Learning privacy preserving representations using deep neural networks
2016	Devansh Arpit *SalesForce, CA*	• Methodologies for learning data manifolds and robust feature representation
2015	Shounak Gore *Qualcomm, NY*	• Social networks analysis using game theory
2015	Yingbo Zhou *SalesForce, CA*	• Towards a globally optimal approach for learning deep unsupervised models
2015	Aarti Shivram *CUBRC, NY*	• Dynamic hierarchical relational models for handwriting recognition on mobile devices
2015	Gaurav Kumar *Amazon, CA*	• Bayesian approaches for word spotting
2014	Chetan Ramaiah *SalesForce, CA*	• Accents in handwriting: A hierarchical Bayesian approach to handwriting analysis
2014	Utkarsh Porwal *JLL, CA*	• A semi-supervised framework for handwriting analysis

Year	Name / Affiliation	Title
2013	Manavender Malgireddy *Amazon, WA*	• Language motivated approaches for human action recognition and spotting
2012	Xi Cheng *Google, CA*	• A novel multi-sample fusion methodology for improving biometric verification
2012	Safwan Wshah *University of Vermont, VT*	• Word spotting in multilingual handwritten documents using character recognition HMM models
2011	Ricardo Rodriguez *Universidade Federal do Rio Grande, Brazil*	• Transfer Learning for probability density estimation
2011	D. You *University of Michigan, MI*	• Methods for content extraction towards improved biomedical multimodal retrieval
2010	Xijun Peng *ISI, University of Southern California, CA*	• Probabilistic Random Field based text identification
2010	Anurag Bhardwaj *Apple, CA*	• Statistical techniques for efficient indexing and retrieval of document images
2010	Achint O. Thomas *Deep Science and Trusted Datasets, Canada*	• Enhancing cyber security through synthetic handwritten CAPTCHAs
2009	Jiang Li *Quincy University, IL*	• Integrating minutiae based fingerprint matching with local correlation methods
2009	Ifeoma Nwogu *Rochester Institute of Technology, NY*	• Statistical modeling and inferencing techniques for medical image segmentation
2008	Zhi Zhang *J. P. Morgan Chase, NY*	• Integrating facial expressions and skin texture in face recognition
2008	Huaigu Cao *ISI, University of Southern California, CA*	• Enhancement and retrieval of low quality handwritten documents
2008	Faisal Farooq *IBM Watson Research, NY*	• Use of language models and automatic topic categorization for indexing and retrieval of handwritten document images
2008	Praveer Mansukhani *Machinomatic Engineers, India*	• A framework for efficient fingerprint identification using a minutiae tree
2008	Roman Yampolisky *University of Louisville, KY*	• Intrusion detection using spatial information and behavioral biometrics
2008	Amalia Rusu *Fairfield University, CT*	• Exploiting gap between human and machine in handwriting recognition
2007	Chaohong Wu *KLA-Tencor, CA*	• Framework for fingerprint enhancement and feature detection
2007	Suryaprakash Kompalli *INSOFE, India*	• Stochastic framework for font-independent Devanagari OCR
2007	Robert Milewski *@Hidden, Japan*	• Automatic search engines for handwritten medical forms
2006	Sergey Tulyakov *University at Buffalo, NY*	• A complexity framework for combining classifiers in biometric systems

2005	Tsai Yang Jea *Bloomberg, NY*	•	Minutiae-based partial fingerprint recognition
2005	Hansheng Lei *University of Texas, Rio Grande Valley, TX*	•	Sequential pattern classification without explicit feature extraction
2003	Ankur Teredesai *University of Washington, Tacoma, WA*	•	Use of genetic programming for advanced pattern recognition
2002	Hanhong Xue *Google, NY*	•	Stochastic models for handwritten word recognition
2000	Ianiev Krassimir *Fair Isaac, Inc., CA*	•	Organizing multiple experts for efficient pattern recognition
2000	Jaehwa Park (*Co-advised*) *Chung-Ang University, S. Korea*	•	Hierarchical character recognition in handwritten phrase recognition
1997	Sriganesh Madhvanath (*Co-advised*) *eBay, NY*	•	The holistic paradigm in handwritten word recognition and its applications
1996	Gyeonghwan Kim (*Co-advised*) *Sogang University, S. Korea*	•	Handwritten word recognition for real-time applications

Major Adviser of graduated Masters students (17) with thesis option

2013	Nisha Bhaskaran *Time Inc., CA*	•	Facial Expressions and Deception
2009	Omar Mukhtar *Amazon, WA*	•	Language Modeling
2009	Bhaskar Purkayastha *Hughes Systems, MD*	•	Gesture Recognition
2008	Daemien Jose *Microsoft, WA*	•	Transcript Mapping
2006	Kartik Sridharan *Cornell University, NY*	•	Sematic Face Recognition
2006	Sankalp Nayak *Morgan Stanley, NY*	•	Devanagari OCR
2006	Shamalee Deshpande *Veritas Technologies, CA*	•	Accent in Speech
2005	Amit Mahtre *Amazon, WA*	•	Hand Geometry Biometrics
2005	Sharat Chikkerur *Microsoft, MA*	•	Fingerprint Verification
2004	Pawan Rudravaram *Qualcom, CA*	•	Palmprint Recognition
2004	Sumeet Manocha *Patni Computers, India*	•	Security of Biometrics Systems
2004	Viraj Chavan *Nividea, CA*	•	Biometrics and Barcode Representation

2004	Srinivas Palla *Amazon, CA*	•	Multimodal Biometrics
2003	Swapnil Khadekar *Bloomberg, NY*	•	Devanagari OCR
2000	David Bartnik *Qualcom, NY*	•	Video Surveillance
2000	Gaurav Pal *BMC Software India*	•	Music Index on the Web
2000	F. Zhou *Panasonic, NJ*	•	Thinning Algorithms

2000-14   **McNair Scholars program (post baccalaureate)**

HON 101: Presidential Scholars Development Seminar (undergraduates)

11/3/2016	Experiential Learning Activities	16 students
11/5/2015	Experiential Learning Activities	19 students

- 18 academic institution placements including tenure track faculty positions in Cornell University and University of Washington.
- 4 placements in top university research labs: Dartmouth, USC, UB, and University of Michigan.
- 2 MS students went to graduate with doctorate from MIT and University of Chicago.
- Students placed in USA, Brazil, India, Japan, China, and S. Korea.

E. Teaching

Undergraduate Lower Division		Class size
Fall 94	Introduction to Programming	90
Spring 95	Introduction to Programming	90
Undergraduate Upper Division		
Summer 89	Introduction to Artificial Intelligence	30
Fall 96	Computer Architecture and Organization	98
Spring 97	Algorithms and Data Structures	40
Spring 98	Computer Architecture and Organization	100
Fall 98	Computer Architecture and Organization	94
Spring 99	Computer Architecture and Organization	67
Graduate core classes		
Spring 00	Operating Systems	59
Fall 00	Operating Systems	76
Advanced graduate classes		
Fall 00	Topics in Artificial Intelligence	8
Fall 03	Document Analysis and Recognition	6
Spring 03	Topics in Artificial Intelligence	13
Spring 04	Topics in Artificial Intelligence	13
Fall 04	Image Analysis	12
Spring 05	Topics in Artificial Intelligence	11
Fall 05	Topics in Artificial Intelligence	7
Spring 06	Biometrics	6
Spring 07	Topics in Artificial Intelligence	8
Fall 07	Biometrics	10
Spring 08	Topics in Artificial Intelligence	6
Fall 08	Biometrics	7
Spring 09	Markov Models	7
Fall 09	Biometrics	11
Spring 10	Machine Learning	9
Fall 10	Biometrics	10
Spring 11	Machine Learning	13
Fall 11	Machine Learning	17
Spring 12	Biometrics	9
Fall 13	Biometrics	13
Spring 14	Topics in Artificial Intelligence	16
Fall 15	Topics in Artificial Intelligence	7
Fall 16	Topics in Artificial Intelligence	7
Fall 17	Deep Learning	10
Fall 19	Biometrics and Machine Learning	13

F. Professional Service

External Leadership & Service

• SUNY-IBM Artificial Intelligence Research Alliance	Advisory Council	2019- current
• Empire Discovery Institute, NY	Board of Directors	2018- current
• Hauptman Woodward Institute, NY	Board of Directors	2015- current
• Buffalo Niagara Enterprise, NY	Board of Directors	2014 - 2016
• Asian Indian Community Foundation of WNY	Vice President	2008 - 2012
• Girl Scouts of Buffalo, NY	Board of Directors	2004 - 2006

Professional Societies Activities

• IEEE Biometrics Council	President	2015 - 16
• IEEE Biometrics Council Nominations Committee	Chair	2009 - 11, 17-19
• IEEE Biometrics Council (Education)	Member	2007 - 08
• IEEE Education Activities Board	SME	2007 - 08
• International Graphonomics Society (IGS)	Secretary	2007- 09

Editorial Boards

• IEEE Access	2015 - on
• IDRBT Journal of Banking Technologies	2017 - on
• IEEE Transactions on Information Security and Forensics	2014 - 2016
• IEEE Biometrics Compendium (Editor-in-Chief)	2012 - 2016
• IET Biometrics Identification	2011 - on
• Journal of Technology Management for Growing Economies	2010 - on
• International Journal on Document Analysis and Recognition	2003 - on
• International Journal of Pattern Analysis and Applications	2004 - 2008
• IEEE Transactions on Systems, Man, and Cybernetics (B)	2000 - 2008
• IEEE Transactions on Pattern Analysis and Machine Intelligence	2001 - 2005
• The Journal of Pattern Recognition	1997 - 2005

Conference Leadership

• Honorary Chair	IEEE International Conference on Document Analysis and Recognition, San Jose, CA	Aug. 2023
• General Chair	IEEE International Conference on Identity, Security, and Behavioral Analysis (ISBA), Hyderabad, India	Jan. 2019
• General Chair	IAPR International Conference on Frontiers of Handwriting Recognition, Niagara Falls, NY	Aug. 2018
• Honorary Chair	IEEE International Conference on Identity, Security, and Behavioral Analysis (ISBA), Singapore	Jan. 2018
• General Chair	IEEE International Conference on Identity, Security, and Behavioral Analysis (ISBA), New Delhi, India	Feb. 2017
• General Chair	IAPR Summer School on Document Analysis: Document Informatics, Jaipur, India	Jan. 2017

•	General Chair	IEEE Biometrics, Theory, Algorithms, and Systems (BTAS), Niagara Falls, NY	Sept. 2016
•	General Co-Chair	International Conference on Information and Systems Security (ICISS), Hyderabad, India	Dec. 2014
•	Sponsorship Chair	International Joint Conference on Biometrics, Tampa, FL	Sept. 2014
•	Area Co-Chair	International Conference on Pattern Recognition (ICPR), Stockholm, Sweden	Aug. 2014
•	General Co-Chair	Int. Conf. on Document Analysis and Recognition, Washington, D.C.	Sept. 2013
•	General Co-Chair	ICDAR Multilingual OCR Workshop (MOCR), Washington D.C.	Aug. 2013
•	General Co-Chair	Int. Conf. on Information Assurance and Management, Buffalo, NY	Aug. 2013
•	Industry Chair	IAPR International Conference on Biometrics (ICB), Madrid, Spain	Jun. 2013
•	Program Co-Chair	CVPR Biometrics Workshop, Portland, OR	Jun. 2013
•	Tutorials Co-chair	IAPR International Conference on Biometrics (ICB), Spain	Jun. 2013
•	Track Chair	Int. Conf. on Pattern Recognition, Tsukuba City, Japan	Nov. 2012
•	Program Chair	CVPR Biometrics Workshop, Providence, RI	Jun. 2012
•	Advisory Board	International Conference on Information Systems for Indian Languages, Patiala, India	Dec. 2011
•	Area Chair	Indian Conference on Computer Vision and Image Processing, Chennai, India	Dec. 2011
•	General Co-chair	Multilingual OCR Workshop, Beijing, China	Sept. 2011
•	Program Chair	CVPR Workshop, Colorado Springs, CO	Jun. 2011
•	Advisory Board	Multimedia Signal Processing	Apr. 2011
•	Tutorials Chair	Int. Conf. on Handwriting Recognition, Kolkata, India	Oct. 2010
•	General Co-Chair	1st International Workshop on Emerging Techniques and Challenges for Hand-based Biometrics , Istanbul, Turkey	Aug. 2010
•	General Co-Chair	International Workshop. Document Analysis Systems, Boston, MA	Jun. 2010
•	Program Chair	CVPR Biometrics Workshop., San Francisco, CA	Jun. 2010
•	Steering Committee	Computational Modeling of Objects Presented in Images: Fundamentals, Methods, and Applications, NY	May. 2010
•	General Co-Chair	Multilingual OCR Workshop., Barcelona, Spain	Jul. 2009
•	Program Chair	CVPR Biometrics Workshop., Miami, FL	Jun. 2009
•	Program Co-Chair	Document Analysis Track (ICPR) Tampa, FL	Dec. 2008
•	Awards Committee	IEEE Biometrics Symposium, Tampa FL	Sept. 2008
•	Program Co-Chair	2nd IEEE Conf. on Biometrics: (BTAS), DC	Sept. 2008
•	Program Chair	CVPR Biometrics Workshop., Anchorage, AL	Jun. 2008
•	Program Co-Chair	International Conference on Cognition and Recognition, India	Apr. 2008
•	Steering Committee	Indo-US Symposium on Data Info Knowledge Spectrum	Dec. 2007
•	Program Co-Chair	1st IEEE Conf. on Biometrics (BTAS), DC	Sept. 2007
•	Program Chair	CVPR Biometrics Workshop., Minneapolis, MN	Jun. 2007

•	Program Chair	CVPR Multi-biometric Workshop., NY, NY	Jun. 2006
•	General Co-Chair	Int. Conf. on Cognition and Recognition, India	Dec. 2005
•	General Chair	4th IEEE Int. Workshop. on AutoID, NY	Oct. 2005
•	Program Co-Chair	Int. Conf. Document Analysis and Recognition, Korea	Oct. 2005
•	General Co-Chair	Int. Workshop. on DIAL, Palo Alto, CA	Jan. 2004
•	General Co-Chair	Int. Workshop. on Document Analysis and Retrieval, WI	Jun. 2003
•	Publicity Chair	New York State Cyber-Security Symposium, Utica	Feb. 2003
•	Program Co-Chair	International Workshop. on Handwriting Recognition	Sept. 2002
•	Technical Committee	IEEE SMC (B) for Pattern Recognition	1998- 02

G. Invited Talks

Keynotes, Plenary Talks, and Distinguished Lectures (41)	
09/29/18	International Conference on Computer Vision and Image Processing, Jabalpur, India
07/14/17	International Conference on Computational Intelligence & Data Engineering, Amaravati, India
03/28/17	Open Cloud Institute, University of Texas, San Antonio, TX
06/23/17	International Conference on Biometric and Forensic Engineering, Singapore
02/22/17	International Symposium on Biometric Authentication, Delhi, India
12/19/15	National Conf. on Computer Vision, Pattern Recognition, and Image Processing, Patna, India
08/24/15	IAPR/ ICDAR Outstanding Achievements Award Keynote, Nancy, France
12/14/14	ICVGIP Document Analysis and Recognition Workshop, Bengaluru, India
12/14/14	ICVGIP Workshop on Applications of Computer Vision, Graphics, and Image Processing, Bengaluru, India
12/30/13	Statistics 2013, Advanced Inst. of Mathematical, Statistics, and Comp. Sciences, Hyderabad, India
12/20/13	National Conf. on Computer Vision, Pattern Recognition, and Image Processing, Jodhpur, India
12/07/13	Large Scale Visual Commerce Workshop, at Int. Conf. Computer Vision, Sydney, Australia
02/22/13	International Conclave on Innovations in Engineering and Management, Patna, India
07/27/12	International Joint Conference on e-Business and Telecommunications, Rome, Italy
12/16/12	Distinguished Lecture Series, Adobe Inc., Bengaluru, India
02/03/12	TACTIC Smart Facilities, Hyderabad, India
12/17/11	IEEE India Conference (INDICON), Hyderabad, India
04/07/11	TACTIC Conference, Trivandrum, India
03/09/11	International Conference on Information Systems for Indian Languages, India
12/15/10	TACTIC Security Conference, Hyderabad, India
05/06/10	Computational Modeling of Objects Presented in Images, Niagara Falls, NY
02/01/10	Government of Jamaica Seminar on National Identification System, Jamaica.
12/21/09	International Conference on Recent Advances on Mathematical Sciences and Applications, Visakhapatnam, India
12/19/09	Workshop on Image and Speech Processing (WISP), Hyderabad, India
12/18/09	3rd International Conference on Pattern Recognition and Machine Intelligence, Kolkata, India

12/14/09	5th International Conference on Information Systems Security, Kolkata, India
09/11/09	HP Technology Summit, Bangalore, India
07/24/09	3rd Workshop on Analytics for Noisy Unstructured Text Data, Barcelona, Spain
03/15/09	11th International Conference on Technology, Policy, and Innovation, Delhi, India
12/30/08	International Conference on Business Data Mining, Hyderabad, India
12/16/08	Indian Conference on Vision and Image Processing, Bhubaneswar, India
07/21/08	Intensive Workshop on Indic Document Recognition, Delhi, India
07/09/08	Lockheed BEACON Center, Rockville, MD (broadcast to 8 remote centers)
02/12/08	IDGA's Military Biometrics Summit 2008, Washington, DC
01/02/08	Platinum Jubilee Conference, Indian Statistical Institute, Kolkata, India
09/29/06	IEEE Western New York Image Processing Workshop, Rochester, NY
12/23/05	International Conference on Cognition and Recognition, Mysore, India
12/15/05	13th International Conference on Advanced Computing and Communication, Coimbatore, India
01/03/05	Amrita University, Coimbatore, India
09/11/04	World Hindi Conference, Amherst, NY
05/09/03	Rochester Institute of Technology, Rochester, NY

Colloquium Talks (30)

10/25/17	National Cancer Institute, Center for Biomedical Informatics and Information Technology, Washington DC
12/22/14	Jawaharlal Nehru Technological University, Hyderabad, India
01/16/13	Acclerated Discovery Lab, IBM Almaden, CA
03/29/13	IBM Almaden, CA
03/01/13	SRC, Syracuse, NY
03/07/12	Syracuse University, Syracuse, NY*
12/23/11	HP, Bangalore, India
10/08/10	Fujitsu Inc, Sunnyvale, CA
10/04/10	Department of Computer Science and Engineering, Lehigh University, PA
07/10/09	Machine Learning Lab, Stanford University, Palo Alto, CA
12/15/08	IEEE Bangalore Chapter, India
05/20/08	École de Technologie Supérieure, Montréal, Québec (IEEE Chapter on CI)
01/28/08	University of California, Riverside, CA
11/09/07	University of New South Wales, Sydney, Australia
02/22/07	Carnegie Mellon University, Pittsburgh, PA
12/01/06	University of Maryland, College Park, MD
04/28/05	Korea Advanced Institute of Science and Technology, Seoul, S. Korea
01/16/05	Brown University, RI
10/10/03	Concordia University, Montreal, Canada
08/14/03	IBM TJ Watson Research Center, Yorktown Heights, NY
05/09/03	Rochester Institute of Technology, Rochester, NY
04/16/03	Wayne State University, Detroit, MI
10/13/02	University of Massachusetts, Amherst
10/09/00	IBM TJ Watson Research Center, Yorktown Heights, NY
06/15/00	Xerox Palo Alto Research Center (PARC)
12/03/99	Xerox, Webster Research Center, Rochester, NY
11/23/99	University of Maryland, College Park, MD
06/28/99	Kent Research Digital Labs, Singapore

03/27/97	Wayne State University, Detroit, MI
12/16/94	University of Michigan, Dearborn, MI

Invited Conferences Talks (22)

19/12/16	International Workshop on Pattern Recognition Applications, Kolkata, India
17/12/15	BB Chaudhuri Conference, Indian Statistical Institute, Kolkata, India
10/29/13	NRC Intelligence Committee Workshop on Science & Tech Investments, Washington DC
06/19/13	International Program on Information Assurance and Management, Buffalo, NY
08/22/12	CAPTCHAs for Remote Cyber Security in Banks, IPIAM, Buffalo, NY
12/20/12	Tutorial Lecture on Machine Learning, Amrita University, India
11/03/08	ROBUST Biometrics Conference, Hawaii
05/16/08	International Sanskrit Digital Library Workshop, Brown University
02/07/07	NYSTAR University Technology Showcase, Rochester, NY
11/17/06	NSF Workshop on International Sanskrit Digital Library Integration, Providence, RI
09/28/06	Summit on Arabic and Chinese Handwriting Recognition, College Park, MD
05/07/05	Workshop on Tools for Indian Digital Libraries, IIIT Hyderabad, India
11/14/03	Griffis Institute Cyber Security Conference, New Paltz, NY
02/25/03	New York State Cyber-Security Symposium, Utica, NY
01/24/03	International Workshop on Technology Development in Indian Languages, Kolkata, India
04/24/01	Symposium for Document Image Understanding Technology (SDIUT), Annapolis, MD
03/29/01	International Workshop. on Technology Development in Indian Languages, Kolkata, India
06/22/00	International Workshop on Multiple Classifier Systems, Cagliari, Italy
05/19/99	National Postal Forum, San Antonio, TX.
11/09/94	Digital Post Modernism, Nice, France
05/10/94	Digital Road Show, UK & France
02/15/94	2nd Census OCR Conference, National Institute of Standards, Bethesda, MD

Invited Talks at UB (16)

07/22/14	UB This Summer
03/14/13	Pi Day: Biometrics and Privacy
10/08/13	UB Insights (Biometrics: Is Privacy a Bygone Concept in the 21st century)
06/07/11	UB Postdoc Forum
03/31/11	UB Management School (Amrita)
07/25/09	UB Catholic Ministry, Newman Center
04/13/07	Guest Speaker, Information Assurance Class, School of Management
12/02/05	UB Friday Forum
09/30/05	IGERT Colloquium Series
07/21/05	UB This Summer
03/12/05	Engineering Seminar & Exhibition, University at Buffalo
07/23/03	UB This Summer
10/29/04	Guest Speaker, Information Assurance Class, School of Management
04/24/03	University at Buffalo, School of Engineering, Dean's Council, Buffalo, NY
11/19/99	Department of Computer Science & Engineering, University at Buffalo, NY
10/16/92	Department of Computer Science, University at Buffalo, NY

Other Seminars (43)

11/08/19	Barrett Womens Club, Buffalo, NY
03/25/19	Aditya Institute of Technology and Management, Tekkali, India
09/01/17	Microsoft Research, Redmond, WA
01/25/17	Maniphal Institute of Technology, Jaipur, India
01/27/17	Birla Institute of Technology Mesra Campus, Jaipur, India
01/19/17	Indian Statistical Institute, Kolkata, India
12/18/13	Prime Minister's Office Complex, Delhi, India
02/20/13	IDRBT, Hyderabad, India
01/02/13	IDRBT, Hyderabad, India
04/02/12	IDRBT, Hyderabad, India
04/12/11	IIT Hyderabad, India
06/08/10	Jawaharlal Nehru Technological University, Hyderabad, India
06/06/10	College of Engineering, Andhra University, Visakhapatnam, India
12/31/09	International Conference on Frontiers of Interface Between Statistics and Sciences, Hyderabad, India
03/16/09	Windows to the World Series, Tata Indicom, Delhi, India
01/05/09	Indian Institute of Technology Madras, Chennai, India
12/29/08	Computer Maintenance Corporation, Tata Group, Hyderabad, India
12/15/08	Hewlett Packard Research, Bengaluru, India
12/04/08	University of Hyderabad, India
08/07/08	Satyam Computers, Hyderabad, India
08/05/08	Siddhartha Engineering College, Vijayawada, India
07/22/08	TIFAC, Dept. of Science and Technology, Delhi, India
01/30/08	Google, Inc, Mountain View, CA
01/04/08	HP Research Laboratories, India
01/03/08	Google Research, Bangalore, India
06/04/07	Motorola Labs, Hyderabad, India
05/26/07	IEEE Chapter of Hyderabad and University of Hyderabad, India
01/04/07	Gayatri Vidya Parishad, Visakhapatnam, India
12/30/06	PES College of Engineering, Bangalore, India
11/07/06	Indian Institute of Technology, Delhi, India
11/04/06	IEEE Chapter of Birla Institute of Technology , Ranchi, India
11/04/06	Birla Institute of Technology, Ranchi, India
07/04/06	International Institute of Technology, Hyderabad, India
06/23/06	HP Research, Bangalore, India
05/06/05	Center for Development of Advanced Computing, Hyderabad, India
01/04/05	HP Research Labs, Bangalore, India
12/30/04	Indian Institute of Technology, Chennai, India
07/24/04	AP State Education Council, Hyderabad India
12/30/03	Jawaharlal Nehru Technological University, Hyderabad, India
06/02/03	Tata Consulting Services, Hyderabad, India
07/08/02	International Institute of Information Technology, Hyderabad, India
08/09/01	Institution of Electronics and Telecommunication Engineers, Hyderabad, India
12/24/99	Indian Statistical Institute, Calcutta, India