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## venu govindaraju

*Vice President for Research and Economic Development*  
University at Buffalo, State University of New York (SUNY)  
*September 8, 2023*

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SUNY Distinguished Professor  
Computer Science and Engineering  
<http://research.buffalo.edu>

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### EDUCATION

1992 Ph.D. Computer Science, University at Buffalo, SUNY  
1988 M.S. Computer Science, University at Buffalo, SUNY  
1986 B.Tech. Computer Science and Engineering, Indian Institute of Technology Kharagpur

### EXECUTIVE LEADERSHIP POSITIONS

*University at Buffalo, State University of New York*

1/16 - Present Vice President for Research and Economic Development  
7/13 - 8/15 Director, Computational Data Science and Engineering  
1/07 - 8/15 Director, Strategic Strength in Information and Computing Technology  
1/05 – President Director, NSF IUCRC Center for Identification Technology Research (CITeR)  
1/04 – Present Founding Director, Center for Unified Biometrics and Sensors  
1/94 – 1/04 Associate Director, Center for Document Analysis and Recognition (CEDAR)

### ACADEMIC POSITIONS

*Department of Computer Science and Engineering, UB, SUNY*

11/10 – Present SUNY Distinguished Professor  
09/08 – 11/10 UB Distinguished Professor  
08/02 – Present Professor  
08/00 – 8/02 Associate Professor  
06/92 – 8/00 Research Scientist, Senior Scientist and Principal Scientist, CEDAR

### EXTERNAL LEADERSHIP

6/23 – Present Co-Chair, SUNY Task Force on Artificial Intelligence (AI)  
3/23 – Present Member, AAU Task Force on Expanding U.S.-India Partnerships  
1/23 – Present Director and PI, NSF AI Institute for Exceptional Education  
(Consortium of 9 universities including 30 faculty and half a dozen outreach organizations)  
2019 – Present Advisory Council, SUNY-IBM Artificial Intelligence Research Alliance  
2018 – Present Board Director, Empire Discovery Institute, NY  
2018 – 2020 Member, APLU Council of Research, Executive Committee  
2016 – Present Board Chair, Buffalo Corporation 2020, NY  
2015 – Present Board Member, Hauptman Woodward Institute, NY  
2014 – 2016 Board Member, Buffalo Niagara Enterprise, NY  
2014 – 2021 Distinguished Advisor, Institute for Development and Research in Banking Technologies  
2004 – 2006 Board of Directors Member, Girls Scouts of Buffalo, NY

### RESEARCH SUMMARY (faculty capacity)

- Area: Machine Learning and Artificial Intelligence; Computer Vision and Pattern Recognition; Biometrics
- Publications: 6 patents; 463 reviewed technical papers; 8 edited books (17,000 citations; h-index 70)
- Major Adviser: 50 doctoral students (44 graduated); 17 masters students graduated (thesis option)

- Sponsored research: Total grants \$96M; Principal Investigator on \$42M; PI of \$20M NSF AI Institute
- Service: IEEE Biometrics Council President; editor-in-chief and editorial board member of top journals
- Delivered more than 150 seminars worldwide including several distinguished and plenary talks

## AWARDS & HONORS

- **Fellow of the AAIA** - Asia-Pacific Artificial Intelligence Association (2022)
- **IEEE Biometrics Council Distinguished Lecturer** (2022-24)
- **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
- **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"
- **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
- **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."

## BEST PAPER AWARDS

- FG 2nd Best Student Paper Award, (Deen Mohan and Nishant Sankaran), Jodhpur, India, 2020
- ICDAR Best Student Paper Award, (Fei Xu), Sydney, Australia, 2019
- CBDAR Best Paper Award, Sydney, Australia, 2019
- Data for Development Challenge, National Statistics Prize (Neeti Pokhriyal), Boston, 2015
- ICFHR, ITESOFTE Best Paper Award, Kolkata, India, 2010
- ICPR, IBM Best Student Paper Award, (X. Peng), Istanbul, Turkey, 2010
- ICDAR Best Paper Award, ICDAR 1st Place in Line segmentation competition, Barcelona, 2009

## IMPACT

- Designed an early AI success story by making postal address recognition and deployment of engineered systems a reality, saving the postal services of US, UK, and Australia, hundreds of millions of dollars. Computing Community Consortium (<http://cra.org/ccc/>) refers to this seminal work: **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..." March 25, 2009.

## I. KEY LEADERSHIP ACCOMPLISHMENTS

(2016 – Present)

### I. Administration

- Chairing a high-level team of vice provosts, deans, and senior staff to position UB as the leader in **integrating scholarship and innovation with industry needs, commercialization, workforce diversity, STEM pipelines,** and jobs to create a regional economic hub.
- Identified and cultivated technical leaders and teams across campus to improve preparedness to respond competitively to high value, federal opportunities (**EDA Tech Hubs**) that pivot equally on scholarship and economic development.
- Defining the new scope and vision of UB research and economic development accorded by the recent flagship status designation by the governor and the 2030 **aspirational goal of \$1B annual research expenditures**; calling for transformational infrastructural investments to excel at fulfilling its mission of benefitting citizens of NY state and also the global society.
- Chaired university-wide steering committee on **storage, security, and access of research data** supported through federal and state funding.
- Chaired committee to inform the Provost on STEM departments primed for large one-time investments under a **disciplinary excellence initiative**.
- Chaired university-wide task force on **safeguarding university and faculty assets and interests** to advise faculty and staff on mitigation of undue foreign influence in the research enterprise.
- Reorganized Sponsored Programs and Services by adding new FTEs in liaison roles to improve the support to faculty by implementing a hybrid of central and decanal staffing mechanism to **stem attrition forces triggered by the pandemic**, work-life balance, workflow efficiencies, and staff morale.
- Implemented a **salary review of staff** to address disparities in compensation when compared to national averages at AAU public universities
- Created a Faculty Research Hub for **one-stop faculty support** of pre- and post-award operations, team proposal preparation, industry contracts, compliance, and computing.
- **Redefined roles of staff** to make units (reporting to VPRED) more efficient, fiscally self-sufficient, and to stay current with the needs of faculty and students in the ever changing research landscape
- Reorganized Tech Transfer to **maximize the synergy between units** focused on external facing partnerships (with the community) and internal facing support services for faculty and staff thereby strengthening UB's role as the main driver of economic impact in WNY (staff reorganized: 70)
- Reorganized Research Institute on Addictions to **integrate new curricula and clinical services** with the research program to best counter the rising addiction crisis by taking a holistic approach and consider the opportunities afforded by the new laws governing medicinal use (staff reorganized: 60)
- Addressed **diversity, equity, and inclusion (DEI)** in the research enterprise with cognizance of post-pandemic hybrid workplace; informed by campus-wide surveys, focus groups, and a dedicated diverse standing committee charged with recommending systemic changes.
- Implemented **Shared Governance** model in the Research Office by holding annual retreat camps with participation from all the center directors and unit heads to allow free exchange of ideas and transparency on all initiatives, monthly meetings with associate deans to vet new policies.
- Established the **Clinical Research Office** in partnership with the Vice President of Health Sciences to spur clinical trials and industry engagement; implemented new policies of budgeting, revenue sharing, human subjects' compensation in clinical trials, and IRB management.

- Collaborate with **University Advancement** to cultivate and steward high-capacity prospects, carry out *soft* solicitations and develop strategy around prospects and alumni donors.

## II. Diversity and inclusion

- Supported the establishment of the “Community Health Equity Research Institute” to put the strength of UB Research and Innovation in the fight to **eliminate health disparities** in Buffalo.
- Modified all marketing communications, and websites in our Business Entrepreneurships and Partnerships unit to **reflect our values of inclusion** with transparent goals on recruitment to diversify the workforce, so that it is representative of the community we serve.
- Set specific goals to increase female and minority startup founders and to increase the number of minorities hired by the startups as they grow; this entails **supporting “pipeline” programs** to reach out to historically underrepresented minorities; includes Inclusive Blackstone Launchpad and new partnerships with the Buffalo based *Beverly Grey* and nationwide organization *Efor All* which are focused on supporting underrepresented entrepreneurs.
- Partnered with the Dean of Engineering school to **recruit underrepresented faculty** in Computer Sciences under system wide initiatives.
- Charged a cross-decanal committee to address **social equity in research**, promote awareness and bring systemic changes in the research enterprise; covers the functions of training, recruiting, infrastructural support, mentoring, and excellence.
- Leadership in several research grant applications to create a **Safe and Inclusive Research and Academic Environment**; enabled the T32-Initiative for **Maximizing Student Diversity**; a 5-year training grant from the National Institute for General Medical Sciences to support 12 underrepresented PhD in Biomedical, Behavioral and STEM disciplines.
- Developing outreach programs by **actively joining and participating in minority organizations** and taking leadership roles in community efforts such as the Greater Buffalo Racial Equity Roundtable and *TechBuffalo*; focused on addressing systemic issues of racism and diversification of workforce.
- STEM diversity summer program speaker, presenting to undergraduate students from institutions across the country (~50 participants) to **motivate and inspire them to join STEM graduate studies**.

## III. Faculty Development

- Identified annually departments and areas that match the university’s strategic vision to make **high profile hires** under SUNY’s Empire Innovation Program (on behalf of the provost)
- Advocated to the provost to consider community engagement and **commercialization activities in faculty promotion dossiers** at par with scholarship in efforts to recognize impact.
- Search and **appointments of Associate Vice Presidents (6)** and over a dozen research 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 25 interdisciplinary faculty members** across decanal units (Engineering, Arts & Sciences, Business) to build strength in Information Technologies (Director role, 2008-13)
- Established best practice guidelines for the VPR office to **ensure diversity and inclusion** in the recruiting process by persistent messaging, vigilant monitoring, and ensuring diversity in pools.
- Collaborated with the provost’s office in **retaining several high-profile faculty members** on campus with retention packages that constituted funding for labs, instruments, postdocs, and more

- Launched a Grand Rounds forum for **highlighting the research of distinguished faculty** as well as recognizing early career awardees and other accolade winners from both STEM and non-STEM areas.
- Establishing a Scientific Fellows program to **recruit “Distinguished Research Faculty”** (non-ladder) that will be self-sustaining and enhance the research profile of highly ranked departments.

#### IV. Student Focus

- Partnered with dean of undergraduate education to develop **experiential learning network** portal so that students can avail credit bearing as well as purely experiential projects of varying durations.
- Launched the **e-Law clinic** in partnership with the Law School to offer experiential opportunities to students with real businesses and high-growth ventures.
- Established undergraduate research **abroad** summer program featuring a personalized matching process between students and international research mentors; provides experiential opportunities and visits to the host country’s iconic academic and cultural institutions.
- Partnered with Student Life and the Undergraduate School to establish a “mixer social day” that allows for **undergraduate students to be recruited and mentored** solely by graduate students and postdocs to break the barrier of intimidation and shyness; promotes easy exposure to research, getting questions answered without hesitation, and welcoming of underrepresented minorities.
- 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, and iii) development of new graduate certificates in genomic literacy, advanced manufacturing, robotics
- Paired local companies in life sciences and materials informatics with undergraduate students for **internships (for pay or credit) leading to employment** upon graduation; class projects designed with real industry challenges and data; sponsorship of graduate student research thesis (partnered with University Career Services)
- 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 (Panacci Tech), startups, networking events, hackathons, and more.
- Established a **shadow alumni** program in partnership with Career Services that pairs undergraduate students with alumni; students shadow alumni (days to weeks) to gain an understanding of what entails an industry job in their field; opens avenues for networking, internship and job prospects.
- Organized **company visits** to campus to promote to students both inside and outside of the classroom, thereby exposing them to various opportunities so they can make informed career choices.
- Organized innovative **Sprints & Hackathons** by posing a challenge to groups of students to think of innovative solutions that companies can use as part of experiential learning to students.

#### V. Inter-disciplinary Research

- Exceeded \$422M annual research expenditures on NSF Higher Education Research and Development (HERD) Survey (2020); achieved more than **30% rise in sponsored research**; the submission of large team-science proposals doubled in the last five years.
- Selected the best team proposals on campus under the **Bold Ideas Initiative** (\$10M internal investment) to promote ideas and teams and position them for winning philanthropic awards.
- Established a \$3M annual 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 societal problems

- Established over a dozen **new research centers** to support star researchers and faculty clusters; recent examples are the Institute of Artificial Intelligence and Data Science (IAD) and the Center for Information Integrity with equal leadership stakes of STEM and non-STEM faculty
- **Accreditations** from AAHRPP (Association for the Accreditation of Human Research Protection Program) and AAALAC (Association for Assessment and Accreditation of Laboratory Animal Care)
- 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 and new faculty hires to fill gaps and further strengthen areas
- Implemented a plan for creating sustainable fund for purchase of **high-end instrumentation** for shared use by PIs so they can conduct cutting-edge research and prepare competitive team-science proposals.
- Enabled wins of **large federally funded competitive research centers** (selected)
  - (i) NSF AI Institute for Exceptional Education - \$20M
  - (ii) MURI on Assessment of Nano/Microelectronics Devices - \$7.5M
  - (iii) AFRL Space University Research Institute on Space Domain Awareness - \$5M
  - (iv) EPA Machine Learning prediction tools for neurodevelopment - \$5M
  - (v) NNSA Center for Exascale Simulation of Hybrid Rocket Motors - \$8.5M
  - (vi) NSF Science and Technology Center on Biology with X-Ray Free Electron Lasers - \$23M
  - (vii) NIH Clinical and Translational Science Award (CTSA) - \$15M; \$23M renewal awarded.
  - (viii) PCORI (Patient-Centered Outcomes Research Institute) awards - \$10.0M.
- Enabled wins of **large NY State sponsored projects** through intensive engagement of NYS Economic State Development (ESD) through its Division of Science, Technology, and Innovation (selected)
  - (i) NYS New Drug Discovery Center to move PI's targets to commercialization - \$35M.
  - (ii) NYSTAR Centers of Excellence in Bioinformatics and Life Sciences and Materials and Informatics
  - (iii) NY State Innovation Hub for technology commercialization and incubation space - \$32M
  - (iv) NYS Buffalo Institute for Genomics & Data Analytics (BIG) - \$49.5M
  - (v) Center for Advanced Technology in Big Data and Health Sciences (CAT) - \$10.0M
- Enabled wins of **competitive Foundation grants** (selected)
  - (i) JPB Foundation in support of Environmental Justice - \$6M (2017-23)
  - (ii) Mellon Foundation in support of Indigenous Studies - \$3M (2020)
  - (iii) Community Foundation for Greater Buffalo East Side Corridor Economic Development - \$3.2M (2022)

## VI. Innovation and Partnerships

- Launched the Innovation Hub to **accelerate the growth of startups** from UB and its partners across technology sectors in Western New York through a NY state initiative.
- 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.
- 150 **technologies ready to commercialize**, 50 active startups, and 2 incubators offering co-working space to connect with a diverse network of entrepreneurs.
- Enabled partner companies to **create over 1500 jobs** in western NY over four years; UB economic impact for the WNY region is over \$3B annually.
- Created the UB **SWIFT program** to reduce transaction time with industry by eliminating lengthy, costly negotiations; both parties encouraged to set licensing terms at the project planning stage.

- Created an incentive plan to stimulate industry engagement by **simplifying the licensing process** with pre-packaged templates and expedited agreements to avoid long and arduous negotiations
- Quadrupled **SBIR/STTR** projects by incentivizing partnerships of faculty PI with companies to win large multi-phase federally funded projects.
- Convert **scientific breakthroughs into viable pharmaceuticals** through the Empire Discovery Institute by overcoming key challenges faced in drug discovery.

## II. ADMINISTRATIVE EXPERIENCE

### VICE PRESIDENT, RESEARCH & ECONOMIC DEVELOPMENT (2016 – Present)

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* Research & Scholarly Excellence through the cultivation of a world-class research support infrastructure
- *Contribute* to Job Growth and a Diversified Economy through innovation, economic development and commercialization.
- *Ensure* Compliance in a Regulatory Environment that operates through ethical compliance and a lens of diversity, equity, and inclusion.

#### A. Leadership

The VPRED supervises the following units, centers, and communities. While the office units have nearly 150 staff, the total number of members when including all the research centers is closer to 200. The operating budget of the OVPRED is approximately \$35M. 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: 50)  
Submit proposals for funding, provide stewardship of awarded funds, and ensure compliance
  - **Technology Transfer** (staff: 10)
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Guide researchers as their discoveries and inventions become new products and services

❖ Interdisciplinary STEM Centers

- **Center for Post-Acute COVID Sequelae (PASC)**  
Recovery by multidisciplinary approach to caring for those suffering from long COVID
- **Center for Cannabis and Cannabinoid Research (CeCaR)**  
Improve the scientific understanding of the components of cannabis, patterns of use by various populations, health and medical benefits, adverse reactions, including addiction
- **Center for Information Integrity (CI)**  
Combating online disinformation to Improve User Awareness and Resilience
- **Institute of Artificial Intelligence and Data Science (IAD)**  
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 eEnergy, 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
- **Women's Health Initiative (WHI)**  
Focus on strategies for preventing heart disease, breast and colorectal cancer, and osteoporosis in postmenopausal women

❖ Communities of Excellence

Analogous to the concept of *Convergence* in NSF, the idea of "Communities" differs from "Centers" as the pivoting is not necessarily on research but a seamless integration of research, education, and community engagement on solving a societal challenge. Given that real life problems are not cast in silos, the solutions must necessarily be not so either, but rather should be interdisciplinary in their multi-dimensional approach.

- **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)**  
Collaborate 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 focus is 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, 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 \$1 Billion 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 scholar's program.

- Program supports students during summer to conduct research at Cambridge University and Oxford University at labs with UB faculty partnership.
- Encourages students' postgraduate pursuit, cultural mixing and international experience.
- The Entrepreneurship Law Center engages students to provide quality legal services for early-stage entrepreneurs and startups who are not yet ready or able to engage outside legal counsel.
- Enable businesses means to recruit interns, post a job, search and message students, interview on-campus or consult with talent experts to develop a long-term recruitment strategy
- Enable businesses to sponsor an event, speak in a class, host students for a half day to highlight your company or visit the campus to gain access to future graduates
- Enable businesses to tap into groups of students to gain innovative solutions or find a student to conduct a research project on a company initiative

❖ 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

#### ❖ Large Scale Awards

##### **FEDERAL**

- National Science Foundation (NSF), AI Institute for Exceptional Education, \$20M (2023-27)
- Air Force Research Labs (AFRL), Space University Research Institute on Space Domain Awareness - \$5M (2022-27)
- National Nuclear Security Administration (NNSA), Center for Exascale Simulation of Hybrid Rocket Motors - \$8.5M (2020-25)
- 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)
- National Institute of Health (NIH), Clinical and Translational Science Award (CTSA), \$38M (2014-23)

##### **NY STATE**

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

##### **FOUNDATION**

- JPB Foundation in support of environmental justice - \$9M (2017-26)
- Mellon Foundation in support of Indigenous Studies - \$3M (2020)
- Community Foundation for Greater Buffalo East Side Corridor Economic Development - \$3.2M (2022)

#### ❖ Faculty Recruiting

Empire Innovation Program (EIP) is a SUNY-funded grant program dedicated to recruiting and retaining excellent faculty at the State University of New York. On behalf of the provost's office, the VPRED annually identifies 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 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)

Led a systematic analysis of STEM departments to inform university investments primarily for faculty recruiting. Developed dash boards featuring searchable information on proposals, awards, and research expenditures to anticipate research trends and measure research faculty productivity.

❖ 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. 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*.

- Created the following positions and made inaugural appointments.
  - i) Senior Associate Vice Presidents for Research and Operations
  - ii) Associate Vice President for Research Advancement Management, and
  - iii) Associate Vice President for Economic Development
  
- Appointed the directors of the following centers in 2014-22:
  - i) Institute for Artificial Intelligence and Data Science (IAD)
  - ii) Institute for Research in Energy, Environment and Water (RENEW)
  - ii) NYS Center of Excellence in Materials Informatics (CMI)
  - iv) NYS Center of Excellence for Bioinformatics and Life Sciences (CBLS)
  - v) Center for Computational Research (CCR)
  - vi) Clinical Research Office (CRO); joint administration with the Medical School
  - vii) Office of Research Compliance (ORC)
  - viii) Lab Animal Facilities (LAF)
  - ix) Business Entrepreneur and Partnerships (BEP)

❖ 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 Post-Acute COVID Sequelae* to study Long COVID
- Established the *Center for Information Integrity* to combat fake news and propaganda by social platforms
- Established the *Center for Cannabis and Cannabinoid Research* to advance the understanding of all aspects of cannabis, its medicinal benefits and addiction (2021)
- Established the *Institute of Artificial Intelligence and Data Science* to tackle some of the world's biggest problems through groundbreaking research in the following areas: Media Forensics, Big Data, Mobile Computing, Machine Learning, Robotics, Autonomous Vehicles, Natural Language Processing, Human Machine Partnerships, and Law and Ethics (2021)

- Established the *Center for Ingestive Behavior Research* to study the physiological, nutritional, developmental, genetic, sensory, and socio-economic determinants of food and fluid intake (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 (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 clinical research office; joint supervision with the Vice President of Health Sciences (2015)
- Launch and oversight of *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 the Research and Education in Environment, Energy and Water (RENEW) Institute - \$3M/year.
- Launched the *Creative Arts Institute* for creation 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 (2017; 2022)

#### ❖ 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 opportunities and challenges presented by the ever-changing research landscape.

#### ❖ Community Engagement and Outreach

- Rochester-Buffalo metro corridor tours to showcase economic development and innovations assets
- Genome Day – an annual event organized by VPRED brings about 400 8<sup>th</sup>-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

- 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.

### III. CURRICULUM VITAE

#### A. Publications

h-index 70; total citations: 17,000

##### ▪ Books (7)

1. Handbook of Statistics Vol 48: Deep Learning, A. S. Rao, V. Govindaraju, and C. R. Rao (eds.), Elsevier 2023.
2. Handbook of Statistics Vol 35: Cognitive Computing: Theory and Applications, V. V. Raghavan, V. Gudivada, V. Govindaraju, and C. R. Rao (eds.), Elsevier 2017.
3. Handbook of Statistics Vol 33: Big Data, V. Govindaraju, V. V. Raghavan, and C. R. Rao (eds.), Elsevier 2016.
4. Handbook of Statistics Vol 31: Machine Learning Theory and Applications, C. R. Rao & V. Govindaraju (eds.), Elsevier 2013.
5. Multibiometrics for Human Identification. B. Bhanu & V. Govindaraju (eds.), Cambridge University Press 2011.
6. Indic OCR- Document Recognition & Retrieval. V. Govindaraju & S. Setlur (eds.), Springer 2009.
7. Biometrics: Sensors, Systems, and Algorithms. N. Ratha & V. Govindaraju (eds.), Springer 2007.

##### ▪ Journal Papers (87)

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2. K. Davila, F. Xu, S. Setlur, and V. Govindaraju, "FCN-LectureNet: Extractive Summarization of Whiteboard and Chalkboard Lecture Videos", *IEEE Access*.
3. K. Davila, S. Setlur, D. Doermann, B. U. Kota and V. Govindaraju, "Chart Mining: A Survey of Methods for Automated Chart Analysis," in *IEEE Transactions on Pattern Analysis and Machine Intelligence*, vol. 43, no. 11, pp. 3799-3819, 2021. doi: 10.1109/TPAMI.2020.2992028.

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8. B. Urala Kota, K. Davila, A. Stone, S. Setlur, V. Govindaraju, "Generalized Framework for Summarization of Fixed-Camera Lecture Videos by Detecting and Binarizing Handwritten Content", *International Journal of Document Analysis and Recognition - ICDAR Special Issue* 2019.

###### ▪ 2018

9. C. Liu, G. Fink, V. Govindaraju, and L. Jin, "Special Issue on Deep Learning for Document Analysis and Recognition", *International Journal for Document Analysis and Recognition*.

###### ▪ 2017

10. N. Pokhriyal, K. Tayal, I. Nwogu and V. Govindaraju, "Cognitive-biometric recognition from language



usage: A feasibility study”, *Transactions on Information Forensics and Security*, Vol. 12, No. 1, 2017.

11. Gaurav Kumar, Venu Govindaraju, “Bayesian background models for keyword spotting in handwritten documents”, *Pattern Recognition* 64: 84-91, 2017.

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12. S. Wshah, G. Kumar, and V. Govindaraju, “Statistical script independent word spotting in offline handwritten documents”, *Journal of Pattern Recognition*, Vol. 47, No. 3, pp. 1039-1050, 2014.
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#### ❖ 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.
5. US 20080260212. "System for indicating deceit and verity", V. Govindaraju; J. Holsopple; M. Moskal; P. Kilinskas; and T. Slowe, 2008
6. US 20080220984. "Method for diagnosis of physiological states by detecting patterns of volatile analytes", F. Bright; A. Cartwright; V. Govindaraju; W. Hicks; and A. Titus, 2008

**B. Grants & Research Projects Support**

**Total Sponsored Funding: \$92.8M**

<b>Projects</b>	<b>Government</b>	<b>PI: V. Govindaraju</b>	<b>Awards</b>	<b>Period</b>
NSF & IES AI Institute for Transforming Education for Children with Speech and Language Processing Challenges	National Science Foundation (NSF)	Xiong	\$20,000,000	2023-27
Autonomous Target Recognition System for Thermal Infrared Spectrum	US Air Force Research Laboratory (AFRL)	Mitin	\$100,000	2022-23
Biometric Recognition and Identification at Altitude and Range (BRIAR)	Intelligence Advanced Project Activity (IARPA)		\$587,367	2021-24
Center for Identification Technology Research (CITeR) Phase II	NSF	Setlur	\$400,000	2018-22
CITeR Government (MIPR via NSF) Phase II	Dept of Homeland Security (DHS)	Setlur	\$230,806	2018-22
CITeR Government (via WVU) Phase II	DFBA, DHS-Cyber	Setlur	\$529,000	2018-22
CIF21 DIBBs: EI: Data Laboratory for Materials Engineering	NSF	Setlur, Rajan, Furlani	\$2,909,772	2016-22
Janus - Face Recognition	IARPA	Setlur	\$1,300,000	2014-18
Long term active authentication using multi- modal user profiles	NSF	Setlur, Upadhyaya, Nwogu	\$1,200,000	2013-16
Center for Identification Technology Research (CITeR) Phase I	NSF	Setlur, Nwogu	\$300,000	2013-18
CITeR (Government via MIPR) Phase I	DHS	Setlur, Nwogu	\$175,744	2013-18
CITeR (Government via WVU) Phase I	National Security Agency (NSA)	Setlur, Nwogu	\$77,480	2013-18
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	NY Science & Technology Advanced Research (NYSTAR)		\$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 (DCI)		\$240,000	2004-06
Smart Card Biometrics	NYSTAR		\$100,000	2004-05
Automation of Medical Forms	NSF		\$50,000	2003-04
Cognitive Recognition	NSF		\$99,731	2002-03
Devanagari OCR	NSF		\$487,319	2002-04
<b>Total Federal/State Funding as PI</b>			<b>\$36,218,766</b>	
CITeR Industry Phase II	Qualcomm, ACV, Zoloz	Setlur	\$320,000	2018-22
Preparation of Data Sets	Lockheed	Setlur	\$130,000	2014-15
Automated Package Processing System (APPS) Support	Lockheed	Setlur	\$54,571	2013-14
CITeR Industry Phase I	Raytheon, CUBRC, Qualcomm, Zoloz	Setlur, Nwogu	\$350,000	2013-18
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	Applied Media Analysis		\$150,000	2008-10
Document Classification	Copanon		\$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 (PARS)	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
<b>Total Industry Funding</b>			<b>\$5,891,781</b>	
<b>Total Funding as PI</b>			<b>\$42,110,547</b>	

<b>Non-Postal Funding as Co-PI</b>				
AI Driven Adaptive Sensors for Object Recognition	Army Research Labs	Mitin, Oktyabrsky	\$500,000	2021-23
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
<b>Total Funding as Co-PI (Non- Postal)</b>			<b>\$2,211,565</b>	
Perf Eval RCR, AOOs, SSIU	United States Postal Service (USPS)	Setlur	\$279,675	2015-16
<b>Govindaraju Co-PI</b>	<b>Postal</b>	<b>PI</b>		
IES Enhancements, Test Decks, Truthing for PARS V	USPS	Setlur	\$398,000	2016-20
Image Scoring Perf Eval APBS Program	USPS	Setlur	\$26,983	2015
Flats RECO 2	USPS	Setlur	\$38,548	2014
Prep of TD14 Test Deck for Comp Eval DQI Recognition Program	USPS	Setlur	\$224,016	2014-15
Perf Eval for DQI Recognition Program	USPS	Setlur	\$575,462	2013-15
DQI TD13 Test Deck Creation Support	USPS	Setlur	\$249,127	2013-14
Evaluation of Flat Mail Recognition Improvements	USPS	Setlur	\$256,165	2013-14
Image Scoring and Evaluation Support (APPS)	USPS	Setlur	\$77,897	2012-13
DQI Evaluation	USPS	Setlur	\$359,921	2012-13
Cancellation Mark Readability	USPS	Setlur	\$26,974	2012
Test Deck, RCR Development Support	USPS	Setlur, Srihari	\$690,009	2011-12

APBS Parcel Project	USPS	Setlur	\$95,489	2010-11
OCR Assist	USPS	Setlur	\$46,051	2009-10
DQI Evaluation Support	USPS	Setlur, Srihari	\$2,253,975	2008-11
PRIP, FRIP and FSS Evaluation	USPS	Setlur, Srihari	\$786,069	2008-10
Intelligent Mail Technologies	USPS	Setlur, Srihari	\$30,918	2009
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

<b>Total Postal Funding Co-PI</b>			<b>\$46,832,145</b>	
<b>TOTAL FUNDING (PI /Co-PI)</b>			<b>\$72,054,257</b>	
<b>Other funding at CUBS</b>			<b>\$1,648,990</b>	
Informed Address	USPS	Setlur	\$65,000	2021-22
Package Reco R2	USPS	Setlur	\$83,460	2021-22
AMP Audio ML	ACV Auctions	Setlur	\$14,000	2020
EPPS OCR	USPS	Setlur	\$80,000	2019-20
RCR TD19 Evaluation	USPS	Setlur	\$289,121	2019-20
COA Forms Processing	USPS	Setlur	\$123,456	2019-20
Letter Mail Forward Intercept System	USPS	Setlur	\$64,470	2018-19
AFSM100-TR1	USPS	Setlur	\$91,536	2018-19
Interactive Document Processing	W. Interactive	Setlur	\$25,815	2018-19
APPS-SSIU Performance Evaluation	USPS	Setlur	\$82,847	2017-18
RAPTIR	USPS	Setlur	\$169,003	2017
DSS OCR	USPS	Setlur	\$42,315	2016-17
DSS/PASS	USPS	Setlur	\$19,365	2016
Package Reco	USPS	Setlur	\$28,670	2016
RCR, APPS and SSIU Evaluation	USPS	Setlur	\$279,675	2016-17
Flats Recognition	USPS	Setlur	\$48,660	2015-16
DSS	USPS	Setlur	\$50,360	2015
PRES	USPS	Setlur	\$20,011	2015
SSIU-PRES	USPS	Setlur	\$71,226	2014
<b>TOTAL FUNDING (PI /Co-PI + Other CUBS Funding)</b>			<b>\$92,803,247</b>	

## C. Mentorship

### Post-Doctoral Fellows (6)

2023-24	S. Suresh (Amrita PhD)	• Handwriting Recognition and Dyslexia
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 (49)

2025	Sahana Rangasrinivasan	
2025	Alexander Stone	
2025	Bhavin Jawade	
2025	Dennis Fedorishin	
2024	Saleem Ahmed	• Graph based representational learning for summarizing lecture videos
2024	Fei Xu	• Speaker Action classification in lecture videos
2023	Deen Dayal Mohan <i>Verizon, NY</i>	• Improving Representation Learning for Diverse Modalities and Distributions with Metric Learning
2023	Kyung Won Lee	• Learning Appearance Features Using Soft-Biometrics for Long-term Person Re-identification
2021	Nagashri N. Lakshminarayana <i>Amazon, CA</i>	• Modeling Local Attention and Relations for Automated Facial Action Unit Recognition
2021	Nishant Sankaran <i>Amazon, CA</i>	• Feature Fusion for Deep Representations
2020	Bhargav Urala Kota <i>ACV Auctions, NY</i>	• Lecture Video Summarization by detection and representation of content
2019	Neeti Pokhriyal <i>NSF</i>	• Multiview learning via Gaussian processes with applications in biometrics and sustainability
2018	Neeti Narayan <i>Amazon, MN</i>	• Re-identification for online person tracking using spatio-temporal discrimination
2017	Rathin Radhakrishnan <i>Qualcomm, NY</i>	• An adaptive framework for metadata extraction and analysis from documents
2016	Rohit Pandey <i>Google, CA</i>	• Learning privacy preserving representations using deep neural networks
2016	Devansh Arpit <i>SalesForce, CA</i>	• Methodologies for learning data manifolds and robust feature representation
2015	Shounak Gore <i>Qualcomm, NY</i>	• Social networks analysis using game theory

2015	Yingbo Zhou <i>SalesForce, CA</i>	<ul style="list-style-type: none"> <li>• Towards a globally optimal approach for learning deep unsupervised models</li> </ul>
2015	Aarti Shivram <i>CUBRC, NY</i>	<ul style="list-style-type: none"> <li>• Dynamic hierarchical relational models for handwriting recognition on mobile devices</li> </ul>
2015	Gaurav Kumar <i>Amazon, CA</i>	<ul style="list-style-type: none"> <li>• Bayesian approaches for word spotting</li> </ul>
2014	Chetan Ramaiah <i>Google, CA</i>	<ul style="list-style-type: none"> <li>• Accents in handwriting: A hierarchical Bayesian approach to handwriting analysis</li> </ul>
2014	Utkarsh Porwal <i>Walmart, CA</i>	<ul style="list-style-type: none"> <li>• A semi-supervised framework for handwriting analysis</li> </ul>
2013	Manavender Malgireddy <i>Amazon, WA</i>	<ul style="list-style-type: none"> <li>• Language motivated approaches for human action recognition and spotting</li> </ul>
2012	Xi Cheng <i>Google, CA</i>	<ul style="list-style-type: none"> <li>• A novel multi-sample fusion methodology for improving biometric verification</li> </ul>
2012	Safwan Wshah <i>University of Vermont, VT</i>	<ul style="list-style-type: none"> <li>• Word spotting in multilingual handwritten documents using character recognition HMM models</li> </ul>
2011	Ricardo Rodriguez <i>Universidade Federal do Rio Grande, Brazil</i>	<ul style="list-style-type: none"> <li>• Transfer Learning for probability density estimation</li> </ul>
2011	D. You <i>University of Michigan, MI</i>	<ul style="list-style-type: none"> <li>• Methods for content extraction towards improved biomedical multimodal retrieval</li> </ul>
2010	Xujun Peng <i>ISI, University of Southern California, CA</i>	<ul style="list-style-type: none"> <li>• Probabilistic Random Field based text identification</li> </ul>
2010	Anurag Bhardwaj <i>Apple, CA</i>	<ul style="list-style-type: none"> <li>• Statistical techniques for efficient indexing and retrieval of document images</li> </ul>
2010	Achint O. Thomas <i>Deep Science and Trusted Datasets, Canada</i>	<ul style="list-style-type: none"> <li>• Enhancing cyber security through synthetic handwritten CAPTCHAs</li> </ul>
2009	Jiang Li <i>Quincy University, IL</i>	<ul style="list-style-type: none"> <li>• Integrating minutiae based fingerprint matching with local correlation methods</li> </ul>
2009	Ifeoma Nwogu <i>University at Buffalo, NY</i>	<ul style="list-style-type: none"> <li>• Statistical modeling and inferencing techniques for medical image segmentation</li> </ul>
2008	Zhi Zhang <i>J. P. Morgan Chase, NY</i>	<ul style="list-style-type: none"> <li>• Integrating facial expressions and skin texture in face recognition</li> </ul>
2008	Huaigu Cao <i>ISI, University of Southern California, CA</i>	<ul style="list-style-type: none"> <li>• Enhancement and retrieval of low quality handwritten documents</li> </ul>
2008	Faisal Farooq <i>LinkedIn, NY</i>	<ul style="list-style-type: none"> <li>• Use of language models and automatic topic categorization for indexing and retrieval of handwritten document images</li> </ul>
2008	Praveer Mansukhani <i>Machinomatic Engineers, India</i>	<ul style="list-style-type: none"> <li>• A framework for efficient fingerprint identification using a minutiae tree</li> </ul>

2008	Roman Yampolisky <i>University of Louisville, KY</i>	<ul style="list-style-type: none"> <li>Intrusion detection using spatial information and behavioral biometrics</li> </ul>
2008	Amalia Rusu <i>Fairfield University, CT</i>	<ul style="list-style-type: none"> <li>Exploiting gap between human and machine in handwriting recognition</li> </ul>
2007	Chaohong Wu <i>KLA-Tencor, CA</i>	<ul style="list-style-type: none"> <li>Framework for fingerprint enhancement and feature detection</li> </ul>
2007	Suryaprakash Kompalli <i>INSOFE, India</i>	<ul style="list-style-type: none"> <li>Stochastic framework for font-independent Devanagari OCR</li> </ul>
2007	Robert Milewski <i>@Hidden, Japan</i>	<ul style="list-style-type: none"> <li>Automatic search engines for handwritten medical forms</li> </ul>
2006	Sergey Tulyakov <i>University at Buffalo, NY</i>	<ul style="list-style-type: none"> <li>A complexity framework for combining classifiers in biometric systems</li> </ul>
2005	Tsai Yang Jea <i>Bloomberg, NY</i>	<ul style="list-style-type: none"> <li>Minutiae-based partial fingerprint recognition</li> </ul>
2005	Hansheng Lei <i>University of Texas, Rio Grande Valley, TX</i>	<ul style="list-style-type: none"> <li>Sequential pattern classification without explicit feature extraction</li> </ul>
2003	Ankur Teredesai <i>University of Washington, Tacoma, WA</i>	<ul style="list-style-type: none"> <li>Use of genetic programming for advanced pattern recognition</li> </ul>
2002	Hanhong Xue <i>Google, NY</i>	<ul style="list-style-type: none"> <li>Stochastic models for handwritten word recognition</li> </ul>
2000	Ianiev Krassimir <i>Fair Isaac, Inc., CA</i>	<ul style="list-style-type: none"> <li>Organizing multiple experts for efficient pattern recognition</li> </ul>
2000	Jaehwa Park <i>(Co-advised)</i> <i>Chung-Ang University, S. Korea</i>	<ul style="list-style-type: none"> <li>Hierarchical character recognition in handwritten phrase recognition</li> </ul>
1997	Sriganesh Madhvanath <i>(Co-advised)</i> <i>eBay, NY</i>	<ul style="list-style-type: none"> <li>The holistic paradigm in handwritten word recognition and its applications</li> </ul>
1996	Gyeonghwan Kim <i>(Co-advised)</i> <i>Sogang University, S. Korea</i>	<ul style="list-style-type: none"> <li>Handwritten word recognition for real-time applications</li> </ul>

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

2013	Nisha Bhaskaran <i>Time Inc., CA</i>	<ul style="list-style-type: none"> <li>Facial Expressions and Deception</li> </ul>
2009	Omar Mukhtar <i>Amazon, WA</i>	<ul style="list-style-type: none"> <li>Language Modeling</li> </ul>
2009	Bhaskar Purkayastha <i>Hughes Systems, MD</i>	<ul style="list-style-type: none"> <li>Gesture Recognition</li> </ul>
2008	Daemien Jose <i>Microsoft, WA</i>	<ul style="list-style-type: none"> <li>Transcript Mapping</li> </ul>
2006	Kartik Sridharan <i>Cornell University, NY</i>	<ul style="list-style-type: none"> <li>Sematic Face Recognition</li> </ul>
2006	Sankalp Nayak <i>Morgan Stanley, NY</i>	<ul style="list-style-type: none"> <li>Devanagari OCR</li> </ul>

2006	Shamalee Deshpande <i>Veritas Technologies, CA</i>	<ul style="list-style-type: none"> <li>• Accent in Speech</li> </ul>
2005	Amit Mahtre <i>Amazon, WA</i>	<ul style="list-style-type: none"> <li>• Hand Geometry Biometrics</li> </ul>
2005	Sharat Chikkerur <i>Microsoft, MA</i>	<ul style="list-style-type: none"> <li>• Fingerprint Verification</li> </ul>
2004	Pawan Rudravaram <i>Qualcom, CA</i>	<ul style="list-style-type: none"> <li>• Palmprint Recognition</li> </ul>
2004	Sumeet Manocha <i>Patni Computers, India</i>	<ul style="list-style-type: none"> <li>• Security of Biometrics Systems</li> </ul>
2004	Viraj Chavan <i>Nividea, CA</i>	<ul style="list-style-type: none"> <li>• Biometrics and Barcode Representation</li> </ul>
2004	Srinivas Palla <i>Amazon, CA</i>	<ul style="list-style-type: none"> <li>• Multimodal Biometrics</li> </ul>
2003	Swapnil Khadekar <i>Bloomberg, NY</i>	<ul style="list-style-type: none"> <li>• Devanagari OCR</li> </ul>
2000	David Bartnik <i>Qualcom, NY</i>	<ul style="list-style-type: none"> <li>• Video Surveillance</li> </ul>
2000	Gaurav Pal <i>BMC Software India</i>	<ul style="list-style-type: none"> <li>• Music Index on the Web</li> </ul>
2000	F. Zhou <i>Panasonic, NJ</i>	<ul style="list-style-type: none"> <li>• Thinning Algorithms</li> </ul>

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

<b>HON 101: Presidential Scholars Development Seminar (undergraduates)</b>		
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.

## D. Teaching

<b>Undergraduate Lower Division</b>		Class size
Fall 94	Introduction to Programming	90
Spring 95	Introduction to Programming	90
<b>Undergraduate Upper Division</b>		
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
<b>Graduate core classes</b>		
Spring 00	Operating Systems	59
Fall 00	Operating Systems	76
<b>Advanced graduate classes</b>		
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
Fall 21	Computational Vision	26

## E. Professional Service

<b>Professional Societies Activities</b>		
• 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

<b>Editorial Boards</b>	
• IEEE Access	2015 - 2020
• 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

<b>Conference Leadership</b>		
• Executive 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, 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	1 <sup>st</sup> 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	2 <sup>nd</sup> 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	1 <sup>st</sup> 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	4 <sup>th</sup> 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

## F. Invited Talks

### Keynotes, Plenary Talks, and Distinguished Lectures (46)

05/21/23	AI for Exceptional Education, G20 Conference on Digital Education, Trivandrum, India
10/19/22	Inaugural Address, Amrita University, Amaravati, India
10/11/22	IEEE Biometrics Council, Biometrics and Systems Week, Houston, TX
04/29/22	Indian Institute of Technology, Jodhpur, India
12/04/21	International Conference on Computer Vision and Image Processing (CVIP), Ropar, India
07/03/21	International Conference on AI for Social Good (AISG), Amrita University, India
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	International Conference on Pattern Recognition and Machine Intelligence, Kolkata, India
12/14/09	5 <sup>th</sup> International Conference on Information Systems Security, Kolkata, India
09/11/09	HP Technology Summit, Bangalore, India
07/24/09	3 <sup>rd</sup> Workshop on Analytics for Noisy Unstructured Text Data, Barcelona, Spain
03/15/09	11 <sup>th</sup> 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	13 <sup>th</sup> International Conference on Advanced Computing and Comm., 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 (31)

08/09/23	University of Minnesota, Minneapolis, MN
10/20/22	University of Central Florida, Center for Computer Vision, Orlando, FL
10/25/17	National Cancer Institute, Biomedical Informatics and Info Technology, Washington DC
12/22/14	Jawaharlal Nehru Technological University, Hyderabad, India
01/16/13	Accelerated 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
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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	2 <sup>nd</sup> 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 21 <sup>st</sup> 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 (45)

05/24/23	IDRBT, Hyderabad, India
04/22/22	IDRBT, Hyderabad, India
11/08/19	Barrett Women's Club, Buffalo, NY
03/25/19	Aditya Institute of Technology and Management, Tekkali, India

09/01/17	Microsoft Research, Redmond, WA
01/25/17	Manipal 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	Int. Conference on 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