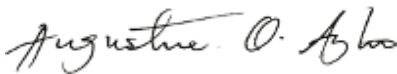


NOMINATION SIGNATURE PAGE

2023 Virginia Outstanding Faculty Awards

Nominations must include this as the cover page of the nomination package PDF submission

Name of Applicant:	Khan Iftekharuddin
Institution:	Old Dominion University
Category (choose only one): <ul style="list-style-type: none">• Baccalaureate Institution• Masters/Comprehensive Institution• Research/Doctoral Institution• Two-Year Institution• Rising Star	Research/Doctoral Institution
Signature of President or Chief Academic Officer:	
Printed Name of President or Chief Academic Officer:	Augustine O. Agho, Provost and Vice President for Academic Affairs
E-mail address of President or Chief Academic Officer:	aagho@odu.edu
Telephone number of President or Chief Academic Officer:	757-683-3079

Mission Statement

Old Dominion University

The Mission of Old Dominion University is as follows:

“Old Dominion University, located in the City of Norfolk in the metropolitan Hampton Roads region of coastal Virginia, is a dynamic public research institution that serves its students and enriches the Commonwealth of Virginia, the nation, and the world through rigorous academic programs, strategic partnerships, and active civic engagement.”

The Mission Support section of the mission statement describes in detail the principles and practices that underlie the University’s undergraduate and graduate teaching, research, and service missions: a sound general educational program; critical thinking; diversity; academic freedom; serving the needs of the local, national, and international communities, including military members and their families; and collaborating with government, industry, and alumni. Finally, the Major Goals of the University are described under the following headings: Students, Faculty, Academic Programs, Teaching, Research, Scholarship and Creativity, Distance Learning, Life-long Learning, Community Service, Student Life, Alumni, and Quality.

A complete statement of the mission and major goals may be found in the *Old Dominion University Undergraduate Catalog 2015-2016* (p. 10-12) and it is available at the following URL: <http://catalog.odu.edu/pdf/2015-16-undergraduate.pdf>.

Summary of Accomplishments

Professor Khan Iftekharuddin is an internationally known renowned scholar whose high-profile research both advances knowledge and serves society. His scholarly research has immense applied value, and, along with his teaching and service, reflects a caring heart.

DISCOVERY

Dr. Iftekharuddin leads a vibrant and internationally recognized research program in the [Vision Lab](#) at Old Dominion University. He applies advanced engineering knowledge to address intricate challenges in human health and wellbeing. Dr. Iftekharuddin contributes to three main areas: (i) 3D medical image analysis and computational modeling, (ii) Machine learning (ML) and deep artificial intelligence (AI) learning, and (iii) Sensor signal processing and human-system interaction.

Dr. Iftekharuddin uses 3D image analysis to attack glioblastoma, the deadly brain cancer which killed senators Edward Kennedy and John McCain within two years of their diagnoses. Despite tremendous advances in biology, diagnosis, and treatment, mortality rates for brain tumors have not improved for decades. Treatment of these tumors depends on robust 3D magnetic resonance imaging (MRI) to identify healthy and cancerous tissue (referred to as “brain tumor segmentation” or BTS) in order to guide tumor-removal surgery (resection), chemotherapy and radiation, and follow up care.

His group pioneered novel “computational texture modeling” of MRI images to quantitatively identify abnormal tissue, predict tumor growth, and perform reliable BTS. These techniques powered his team to consistent top-four rankings in the *Global Brain Tumor Segmentation and Patient Survivability Prediction Challenges* co-organized by the International Conference on *Medical Image Computing and Computer Assisted Intervention* and the National Cancer Institute (NCI) of the National Institutes of Health (NIH). His globally-ranked brain tumor segmentation technique is part of a benchmark study that has been cited over 3000 times and has helped standardize BTS techniques.

Dr. Iftekharuddin’s methods are far superior to the current clinical practice of manual tumor size computation. His techniques could dramatically improve the diagnosis, surgical removal, and treatment of these deadly glioblastomas. The NIH recognized the immense potential of his techniques by awarding him two ‘Concept to Clinic: Commercializing Innovation’ grants to take his methods from the laboratory to clinical practice.

In addition, his novel machine-learning-based patient-survival-prediction methods were the best in the world (<https://www.med.upenn.edu/sbia/brats2017/rankings.html>) in a 2017 Global Challenge. This pioneering research on the application of machine learning for patient survival prediction has been followed by many research groups worldwide. His work on brain cancer has left a lasting impact on both research and clinical communities, providing both numerous clinical applications, and new research avenues for researchers around the world.

In addition to his brain cancer advances, Dr. Iftekharuddin significantly advanced retinal glaucoma analysis using 3D CT (computed tomography) image processing. Glaucoma afflicts about 3 million Americans and is the second leading cause of blindness worldwide. As there are often no early symptoms, early detection could use 3D CT imaging of increased eye pressure caused by glaucoma. Dr. Iftekharuddin and his colleagues developed fractional Brownian-based 3D CT image analysis computational models, which proved very effective in early detection and progression analysis of the disease. This work attracted wide press coverage and yielded a patent (U.S. Patent # 8,632,186).

In his second major area of Machine Learning and deep AI learning, he proposed adaptive

dynamic learning models for distortion-invariant image processing, and visual motion processing. He used these pattern recognition methods for facial expression recognition, gender recognition, and human identification. His bio-inspired adaptive-design neurodynamic networks have been successful in biometrics applications such as facial recognition.

Dr. Iftekharuddin's team proposed novel methods for generalized pattern recognition using recurrent deep learning AI methods for processing facial expression for subjects with autism spectrum disorder (ASD) in simulated social settings. These behavioral biomarkers may then be used to engage the subjects with ASD while interacting with their caregivers and thus improve their quality of life. Facial expression recognition of the patients with ASD using the methods developed by Dr. Iftekharuddin's lab could help these patients to engage in real social settings.

In Dr. Iftekharuddin's third major area of research, he developed a novel electroencephalogram (EEG) sensor signal processing method for patient-specific real-time automatic epileptic seizure-onset detection using several large long-term scalp and intracranial EEG datasets. This kind of reliable and fast seizure detection system can assist with the real-time monitoring and treatment of epileptic seizures for approximately 70 million patients globally. It would also help move medical science from one-size-fits-all treatments to individualized treatment.

In addition, he previously investigated a smart embedding of sensors in machine parts as an early warning system for impending machine failure. This work yielded a US Patent # 6,535,135 B1 which has been cited over 70 times, primarily for industrial applications.

The impact of Dr. Iftekharuddin's research is partially indicated by his four patents, his over 7400 citations since 2017, his career h-index of 35 (according to Google scholar), his over \$18 million research funding from NIH, NSF, DoE, NASA, etc, and his winning the ODU Faculty Research Award.

TEACHING

In all of Dr. Iftekharuddin's courses, he provides a balance between marketable skills, which make students competitive for industrial positions, and theoretical underpinnings, which are required to understand the basis of the skills and to conduct research and development. He teaches at all levels from introductory undergraduate classes to advanced graduate courses in Image Processing, Artificial Intelligence (AI)/ Machine Learning (ML), and Computer Vision.

Dr. Iftekharuddin aims to provide students with a quality education so that they learn and develop the necessary professional skills and expertise to succeed in the workplace. Students appreciate this, writing comments such as, *"The class is well organized and interesting with many relevant 'real-world' applications. Dr. Iftekharuddin has a deep understanding of the course topics and communicates his understanding well."*

He helps his students acquire the confidence to identify problems and find appropriate solutions. He creates and offers opportunities that channel student interests and enthusiasm. As one student wrote, *"(He) let(s) the students have self-motivation and self-learning experience."*

High standards combined with resourcefulness, creativity, and his experience from both industry and academia, help him to be a role model for his students.

Dr. Iftekharuddin believes that an excellent teacher knows how to incorporate his/her research into the classroom. Sometimes, he reformulates his research problems into open ended problems and homework. This fosters students' self-confidence and gets them involved in research, as students commented, *"I liked that my instructor provided us with projects that were challenging and made us think critically."* and *"Also, the professor will give his expert comments and discussions throughout the lecture."*

In rapidly changing disciplines, such as AI/ML, Computer Vision, and Computing, effective instruction requires constant learning and professional development. He stays up to date in two ways. First, by maintaining ongoing relationships with industry (such as Timken Research, and Micron) and government labs (such as Air Force Research Lab, NASA Langley, Army Night Vision Lab, Lawrence Livermore Lab and Jefferson Lab). Second, by sustaining a vibrant and active research program, he advances state-of-the art technologies and methods. For example, Dr. Iftekharuddin's ongoing NIH- and NSF-funded research projects have recently supported five PhD students, who have subsequently gained employment opportunities as research staff and faculty at NIH, Tennessee State University, the US Patent & Trademark Office, and Jefferson Lab.

Dr. Iftekharuddin provides funded research opportunities for his students. He and his colleagues at Jefferson Lab and the ODU Department of Physics obtained a [\\$3M DOE Graduate Traineeship Award](#) to support Graduate Studies in Accelerator Technology at Jefferson Lab. He has been a co-PI on a [National Science Foundation Research Experiences for Undergraduates](#) site award in AI and Cybersecurity for the past five years. This REU grant trains ten undergraduate students each year in cybersecurity, AI, and computing. He obtained multiple REU Supplement awards as part of his NSF and NIH grants and mentored multiple undergraduate students in cutting edge research at ODU. He has mentored over 50 graduate students, 20 undergraduate students, and four postdoctoral fellows. Currently, he is supervising one postdoc, ten PhD students, and two undergraduate students.

KNOWLEDGE INTEGRATION

Dr. Iftekharuddin's entire research agenda is driven by knowledge integration. His research is highly interdisciplinary, spanning fields such as psychology (perception), human cognition and behavior (autism), neuroradiology, computer science, and medicine. He collaborates closely with clinicians from across the country (Children's Hospital of Pennsylvania, San Diego VA, St. Jude's Children's Research Hospital, Eastern Virginia Medical School, Children's Hospital of the King's Daughters, etc.) to develop innovative solutions for intricate challenges to improve human health and wellbeing.

The range of Dr. Iftekharuddin's research affiliations at international universities demonstrates his consistent integration of scholarship in a global higher education context. He has contributed his research as an invited Summer Faculty Fellow twice at the University of Wollongong, Australia, and University of Paris 13. He has organized many international symposiums with his colleagues in the fields of AI, machine learning and information processing. He has been invited to deliver keynote lectures at multiple international venues including University College London, Amity University (one of the top private universities in India), NATO headquarters in The Hague, and international conferences. Dr. Iftekharuddin delivered a weeklong lecture series to the Turkish Navy in Istanbul at the invitation of NATO.

Dr. Iftekharuddin is a member of the interdisciplinary Biomedical Engineering Program at ODU. He previously held a joint appointment in the Biomedical Engineering program at the University of Memphis. Morris Foster, ODU Vice President for Research wrote:

Dr. Iftekharuddin is remarkable for the range of scientific and engineering areas in which he is engaged intellectually, for the corresponding variety of funding sources that support his projects, and for his unique ability to bridge different fields within engineering and across the university. He currently plays a central role in the university's efforts to build an interdisciplinary focus in the data sciences. It is difficult to imagine anyone else at ODU who has the breadth and depth to fill that role. Dr. Iftekharuddin is a true synthesizer of different disciplinary fields within and outside engineering.

In another letter of support, Hani E. Elsayed-Ali, Batten Endowed Professor and Eminent Scholar at ODU, writes, “What most distinguishes the work of Dr. Iftekharuddin from that of other highly-cited researchers is that his work has had a substantial societal impact by improving the health, safety, and welfare of the public. He has also been applying his expertise in machine learning to improve road safety in flood-prone communities.”

From Australia to the Airforce Research Lab in Dayton to the neuroradiology lab at the Children’s Hospital of Philadelphia, Dr. Iftekharuddin’s ethos centers on the transformative potential of collaborative research. The knowledge integration that defines Dr. Iftekharuddin’s work spanning multiple domains of inquiry is most evident in how it creates new techniques and societal outcomes in applied areas such as health diagnostics and wellbeing, defense and homeland security, and machine vision for industry. In Australia, his graduate and undergraduate students worked with their peers to conduct research in advanced methods and gained unparalleled global perspectives. When his students bring these ‘on the ground’ knowledge experiences back to USA, they not only enrich their own studies profoundly, they also deepen the wider curriculum with a grounded global understanding that is increasingly in demand for this connected world.

SERVICE

Dr. Iftekharuddin has served as the Director of the highly successful Vision Lab since 2011. The Vision Lab is an interdisciplinary lab with a diverse research portfolio of local, national, and global importance — including human health, resilient transportation in the face of sea level rise and climate change, defense, and security. It also supports a Research Experience for Undergraduates (REU) and provides opportunities for high school students. His research reaches a wider audience through major national news outlets including CBS and ABC affiliates in Hampton Roads and Memphis.

Dr. Iftekharuddin has also served in many administrative positions. As Department Chair of Electrical and Computer Engineering, he was responsible for all aspects of departmental administration; resource allocation; budget management; ABET reaccreditation; fundraising; promotion, outreach, etc. As an Associate Dean for Research and Graduate Programs, he was responsible for all aspects of research administration. As Interim Dean of the Batten College of Engineering and Technology he was responsible for six academic departments with about 110 faculty, 21 staff, adjunct faculty members, about 2,400 undergraduate and 800 graduate students, and an annual budget of about \$25M.

Dr. Iftekharuddin has been very active in serving professional societies by organizing several conferences. He currently serves as a Senior Editor for Optical Engineering; and Associate Editor for multiple journals including Artificial Intelligence Review, the Journal of Medical Imaging, and several IEEE Transactions journals, including Man, Machine and Cybernetics: Systems; Neural Networks and Learning Systems; Internet of Things (IoT); and Systems, Man and Cybernetics,.

In summary, Dr. Iftekharuddin is a prolific leader in discovery, teaching, knowledge integration, and service. He was cited among the **top 2% researchers in their fields for career and single-year impact in the globe**, Research by Stanford University, [published online](#), 2021. He was awarded Old Dominion University’s 2020 Faculty Research, Scholarship and Creative Achievement Award. His research has consistently attracted coverage in university, local and national media (<https://sites.wp.odu.edu/VisionLab/news/>). Very recently, his **ODU Vision Lab group** secured 1ST place in a recent [worldwide Brain tumor Segmentation competition for Survival Prediction](#) co-sponsored by the National Imaging Program of the National Cancer Institute.

Personal Statement

I was born and raised in Bangladesh. When I was in middle school, my parents made a life changing decision for me. They sent me to a highly selective boarding school in the seventh grade with an acceptance rate of less than 2%. That was the first time I stayed away from home on my own. The first year was especially difficult because I also had to adapt to a very busy schedule that usually started at 5 am and ended at 9 pm each day. This was a profound experience in many ways that early taught me academic excellence, independence, ability to work with others, and life-long friendship. This was also where I was exposed to technology. I was fascinated by an article I came across in Reader's Digest that discussed the emerging field of artificial intelligence (AI). I knew in high school that I wanted to become a computer engineer, even though there was no computer engineering program at that time in Bangladesh. The closest I could do was a B.S. in electrical and electronic engineering, and that was what I did.

After graduation I headed to Dayton, OH for graduate school. Dayton – because one of my friends was going to school there and asked me to join him. This travel to the US was another life changing event-- not just because I was going outside Bangladesh, but also because this was my first time flying. I was going far away from my family. So, it was a bittersweet moment for me. I took a small plane from Newark NJ to Dayton OH. When I landed there, it did not look anything close to what I was expecting about skyscrapers and big cities from watching Hollywood movies.

Soon I experienced the midwestern winter. I stayed a few blocks from the campus and walked to campus sometimes in knee-deep snow and wondered what I was doing there when I could be in tropical Bangladesh. As I engaged more in graduate school and research, I realized that I was not alone in this journey; all international students went through some variation of this experience. The key was to hang in there and things would get better. Another key was working together with other people in shared purpose.

In graduate school I came across AI and took my first course in Neural Networks, nearly 20 years after my first exposure to AI in high school. My advisor guided me to a focused topic of pattern recognition in machine learning research. I got the taste of excitement of publishing my first paper.

After I finished graduate school, I started work in industrial R&D. My dream to become a teacher finally came true when I moved to North Dakota State University for my first tenure track faculty position. My dad was a professor, and he retired as a provost of a public university in Bangladesh. Teaching ran in my family — my grandfather, father and three of my uncles were teachers. This always motivated me to pursue teaching.

I have long been interested in multidisciplinary research and believe that interesting discoveries happen at the intersection of disciplines. I started interacting with colleagues at St. Jude's Children's Hospital after I moved to the University of Memphis more than 20 years ago. There I saw how brain cancer affected little kids and their families, and I felt the urge to do something to help alleviate this suffering. I started attending the weekly 7 AM Tumor Club where doctors from different specialties (radiology, oncology, surgery, trauma, psychiatry, and others) discussed the most difficult brain tumor cases to find the plan forward. These meetings taught me a lot and helped me to learn from the perspectives of healthcare and medical professionals and not just from the siloed perspective of engineering.

I was hired as Director of [the Vision Lab](#) at Old Dominion University in 2011. The Lab aims to develop novel theory, state-of-the-art algorithms, and architectures for learning and real-time applications in human and machine-centered interaction and recognition; biomedical imaging and

signal analysis; and environmental and geoscience applications based on the disciplines of computer vision, signal and image processing, and artificial intelligence/machine learning (AI/ML). Vision Lab is an interdisciplinary lab with a diverse research portfolio. In recent years, the Vision Lab has expanded its research into areas of global and national importance — including human health, resilient transportation in the face of sea level rise and climate change, defense, and security.

Here at ODU, we continued our research on AI/ML and its application to dramatically change the treatment of brain tumors, by developing image-guided extensive, yet targeted, resection and radiation therapy, going well beyond currently-used tumor margins and into much more complicated deeply-infiltrating tumors. Though the prognosis of brain tumors in US has not changed in decades, any improvement to the quality of life for glioblastoma patients helps. Our current work on brain tumor studies involves higher level of integration of imaging patterns with genomics and proteomics information, using AI/ML and pattern analysis methods, ultimately aiming to develop personalized diagnoses and patient survivability predictions.

I have also seen first-hand the agony and pain of parents of a child with autism, my nephew. The inability of a physically healthy child to engage and communicate prompted me to explore ways to help. I reached out to my pediatric colleague at the Children's Hospital of the King's Daughters (CHKD) in Norfolk, who serves children with autism. Together, we have been working to develop novel AI/ML methods to help us understand how children with autism engage (or not) in verbal and non-verbal communications using human-computer interactions. Recently, we expanded our collaborative research to partner with colleagues at Eastern Virginia Medical School working on Alzheimer's disease (AD), a common cause of dementia. Early and accurate diagnosis of AD is essential. We are developing AI methods to improve diagnosis of AD for early and hard to detect cases.

The thread that connects all of my different areas of research and work is AI/ML, image processing and computer vision, coding, and mathematics. My interest in multidisciplinary work guided me to work with colleagues from across engineering disciplines, mathematics, computer science, psychology, and health sciences. This helped me to understand and work on a diverse field of research challenges. I am proud that my work has been funded by a wide variety of agencies, including NSF, NIH, NASA, DOE, ARO, AFRL, AFOSR, NAVY, NVESD, US DOT, the Whitaker Foundation; non-profit organizations such as St. Jude Children's Research Hospital, Southern College of Optometry (Assisi Foundation) and Upper Great Plains Transportation Institute; and companies such as FedEx and Timken Research.

This has been an interesting journey of my life – from a small town in Bangladesh to here at ODU. I consider myself fortunate to have made it from being an international student in graduate school, far from home, to becoming a professor like my father. The care and support of others helped me get here. I try to return care and support to others by working in areas of research that help to relieve suffering and improve health outcomes of some of our most vulnerable citizens, those with devastating diseases.

Abbreviated Curriculum Vitae

EMPLOYMENT

Old Dominion University, Batten College of Engineering and Technology, Norfolk, VA
Professor and Interim Dean, 2021 – 2022.
Professor and Associate Dean for Research and Graduate Programs, 2017- 2021, 2022-
Professor and Director, Vision Lab, 2011 – present.
Batten Endowed Chair in Machine Learning, 2019 – present.

Old Dominion University, Department of Electrical and Computer Engineering, Norfolk, VA
Professor and Chair, 2013 – 2017.

The University of Memphis, Department of Electrical and Computer Engineering, Memphis, TN
Professor, 2011.
Associate Professor, 2003 – 2011.
Undergraduate Coordinator, 2004 – 2011.
Assistant Professor, 2000 – 2003.

North Dakota State University, Department of Electrical & Computer Engineering, and
Department of Computer Science Fargo, ND.
Assistant Professor, 1998 – 2000.

Timken Research, NDE and Sensor Technology Department, The Timken Company, Canton, OH
Principal Research Engineer, 1997 – 1998.

BDM Federal, System Architecture Group, Depot Maintenance System, Dayton, OH
Staff Member, 1994 – 1997.

EDUCATION

- Ph.D., Electrical and Computer Engineering, University of Dayton, OH 45469; 1995.
- M.S., Electrical and Computer Engineering, University of Dayton, OH 45469; 1991.
- B.Sc., Electrical & Electronic Engineering, Bangladesh Inst. of Technology, 1989.

HONORS AND AWARDS

- Cited among the **top 2% researchers in their fields for career and single-year impact in the globe**, Research by Stanford University, [published online](#), 2021.
- Fellow, Society of Photo Instrumentation Engineers (SPIE) (Elected, 2004).
- Awarded Batten Endowed Chair in Machine Learning, ODU (2019).
- Awarded Old Dominion University's 2020 Faculty Research, Scholarship and Creative Achievement Award (https://www.odu.edu/news/2020/9/khan_iftekharruddin_#.X1woStZ7nyw).
- Senior Editor for Optical Engineering journal and Associate Editor for other journals including IEEE Transaction on Man, Machine and Cybernetics: Systems, IEEE Transaction on Neural Networks and Learning Systems, IEEE Transaction on IoT, Artificial Intelligence Review, Journal of Medical Imaging among others.
- Inventor/co-inventor for four patents issued by USPTO and two IP disclosures.
- Senior Member: IEEE (2002), OSA (2013), and INNS (2019).
- Ranked as 3rd team in NIH/MICCAI Global Challenge on Computational Precision Medicine: Radiology-Pathology (CPM: Rad-Path) on Brain Tumor Classification, Lima, 2020.
- Ranked 2nd among 79 teams in NIH/MICCAI Global CPM: Rad-Path Challenge, 2019.
- Received Most Inspiring Faculty Award for Research in College of Engineering and Technology, 2018.
- Certificate of Merit “for outstanding AE in IEEE Transactions on Image Processing”, 2018.
- Ranked 1st among 17 teams in NIH/MICCAI Global Brain Tumor Survival Prediction Challenge, 2017.
- Received ODU Undergraduate Research Program's recognition for mentoring students, 2013 and 2017.
- Awarded Researcher of the Year Award, Old Dominion University, 2014.

- Ranked 3rd among 11 teams in MICCAI Global Competition for Brain Tumor Segmentation, Boston, 2014.
- Ranked 4th among 15 teams in MICCAI Global Competition for Stroke Lesion Segmentation, Japan, 2013.
- Awarded Outstanding Faculty Research Award, The University of Memphis, 2011
- Awarded Researcher of the year award, North Dakota State University, 2000.
- Awarded Best Paper Presentation Award, SPIE, 1998.
- Received Star Award- for advancing diversity awareness, BDM Federal Co., 1996.

SUMMARY OF TEACHING

Courses taught:

- Image Processing (Advanced Graduate), (each Fall since 2011)
- Computer Vision (Advanced Graduate), (each Spring since 2012)

New courses developed and taught:

- Embedded Systems (Graduate/Undergraduate) (Spring 2009; each Fall for 2009-2011)
- Computer Vision (Advanced Graduate) (each Spring since 2005)
- Computer Organization (Graduate/Undergraduate), (each Spring for 2001-2011)

Courses taught:

- Image Processing (Advanced Graduate), (each fall for 2000-2011)
- Computer Architecture (Advanced Graduate), (Fall'01, Spring'03, Spring'04)
- Circuits Analysis I (Undergraduate), (Spring'02, each fall for 2002-2005)

Teaching Laboratories developed:

- Embedded Systems Lab

SUMMARY OF RESEARCH

- Over 9,500 citations of research articles with an H-index of 35 on Google Scholar.
- Published 200+ Peer Reviewed Journal and Conference Articles, one Book and 11 Book Chapters. Delivered 16 invited talks.
- Obtained over \$18 million highly competitive externally funded research grants from NSF, NIH, NASA, DOD, DOE, and the Whitaker Foundation (PI for 90% of these).
 - Recent NSF grant, PI: SCC-IRG Track 2: Scalable Modeling and Adaptive Real-time Trust-based communication (SMARTc) system for roadway inundations in flood-prone communities, \$1,483,427, 2020–2023 (PI).
 - Recent NIH R01 grant: Quantitative Image Modeling for Brain Tumor Analysis and Tracking, NIBIB/NIH, \$1,600,000, 2016–2022 (PI).
 - Recent DOE grant: Graduate Traineeships in Accelerator Engineering and Physics, \$3,000,000, DOE, 2021 – 2026 (Co-PI).

SUMMARY OF SERVICE:

Selected university and professional society service:

- Served on University Senate, multiple college and department committees, Senior Editor and Associate Editor for 7+ journals, 40+ national and international conference organizations and committees.

Selected academic and research service:

- Invited as external reviewer for P&T for about 15 cases both in US and globally.
- Invited to serve on a Special Review panel for comprehensive NIH Resource Center at UCLA – 2007, 2011 and 2017.
- Served on working group to develop comprehensive IEEE Standards for Ethical AI 2019 – 2021.
- NATO Invited Seminar lecturer to Turkish Naval Research Personnel, Istanbul, Turkey, December 2005.

Excerpts from Letters of Support

Supervisors:

Khan Iftekharuddin has made groundbreaking contributions in the areas of computational bio-imaging, image analytics of brain tumors, and tumor prediction. His computational methods improve the accuracy of image-guided tumor volume segmentation and are a vast improvement over manual tumor margin delineation. His research in this area has tangible real-world benefits in the diagnosis, resection, and treatment of high-grade gliomas.

Dr. Augustine Agho, Provost and VP for Academic Affairs, Old Dominion University

Students and Former Students:

Dr. Iftekharuddin *lives* excellence in research and scholarship. He brings out the best in his students through his example. As an advisor, he not only provides mentorship, but also instills within his students the knowledge and confidence to mentor others, building a network of support within his lab. He encourages us to make novel and rigorous technical contributions but never allows us to lose sight of the big picture and broader impacts. With his guidance, feedback, and support, I became a 2020 NSF graduate research fellow. His advisement has had a genuinely positive impact on my life and academic journey. Dr. Iftekharuddin exhibits passion, dedication, and professionalism towards scholarship that is prevalent in all that he does as a mentor and leader in our college and in his field.

Megan A. Witherow, PhD student, ODU

Dr. Iftekharuddin's emphasis on supporting his student's research interests and career goals is one of the many ways in which he has been an invaluable mentor to me and my peers. Early in my graduate career I expressed a great interest in working for NASA, and he supported me every step of the way. After I began working at NASA full-time, Dr. Iftekharuddin facilitated a research partnership between NASA and ODU, allowing me to use my NASA research as the basis for my doctoral dissertation. Dr. Iftekharuddin is a professor who puts his students first, taking the responsibilities of a mentor seriously, and setting an example of excellence for all his students.

Chester Dolph, PhD student, ODU, NASA-Langley

Dr. Iftekharuddin was my doctoral supervisor at ODU, where I had the opportunity to work closely under his supervision for about five years. What sets Dr. Iftekharuddin apart from all faculty members I know is his unique passion for conducting quality and productive research despite his administrative and academic leadership roles. As a mentor, he values the opinions of his mentees, provides sufficient intellectual space to think and grow, and professionally accommodates individuals with diverse backgrounds and skillsets in his research team.

Manar D. Samad, PhD, Assistant Professor, Tennessee State University

Colleagues:

Since I first met Dr. Iftekharuddin, I have been impressed with his broad knowledge, research contributions, leadership and integrity, which have made him a leader in Medical Imaging field, internationally. He is internationally recognized and respected within the Biomedical Imaging and Computational Image Analysis community for his long-standing research contributions and active participation in the society sponsored events. Dr. Iftekharuddin made a number of novel and significant, and often pioneering contributions in the fields of biomedical image analysis, computational intelligence, machine learning, vision and visual pattern recognition.

Christos Davatzikos, Ph.D., Wallace T. Miller Sr. Professor of Radiology, Director, Center for Biomedical Image Computing and Analytics, University of Pennsylvania

I write to emphasize the distinguished national and international impact of Dr. Iftekharuddin's scholarly work and administrative contributions to engineering and computer science research and education. Dr. Iftekharuddin has made a sustained and extraordinary contribution to the body of knowledge in the area of computer vision and signal/image processing. His work has been

particularly relevant to and well-funded by the DoD, DoE, DoT, NSF, NIH, NASA, Whitaker Foundation, and several other governmental agencies, as well as for-profit and non-profit companies and institutions. Sustained funding from such an impressive array of sponsors is clear evidence of the intellectual merit, relevancy, and broader impact of his research agenda.

David Russomanno, Ph.D., Dean, Purdue School of Engineering and Technology, IUPUI

Dr. Iftekharuddin made sustained innovative contributions in Artificial Intelligence (AI) and Machine Learning (ML), and their applications in a wide range of domains. ... He also made significant original contributions in the study of autism behavioral markers by proposing newer computational methods for analyzing 3D tensor geometry in facial expression analysis. This resulted in recently published article in Autism journal showing ability of his proposed learning models to addressing growing health crisis of autism for future intervention design. This research may deepen our understanding of how biology can offer better biomarkers for improving human health. Overall, he has a track record of outstanding research and achievements in the fields.

Haibo He, Robert Haas Endowed Professor and Department Chair, Univ. of Rhode Island

Community Leaders:

Dr. Iftekharuddin embodies the standards expected for a winner of the prestigious SCHEV Outstanding Faculty Award. His rise from untenured adjunct faculty to chaired professor; his numerous grants; his scholarly publications in peer-reviewed journals; his national and international collaborations across disciplinary boundaries; his external awards and numerous university-wide awards, are only fraction of his achievements to mention. I have observed his inclusive and collaborative work with faculty from ODU and other universities. He has developed multi-faceted and cutting-edge research program at ODU. He is an outstanding scholar-teacher. His teaching style is unique. He always provides opportunities for his students to develop their own individual abilities. Importantly, he never imposes his opinions on students, but rather he always helps them to independently recognize, appraise, and pursue potential opportunities.

Hamid Okhravi, MD, Director, Memory Consultation Clinic, Eastern Virginia Medical School, Norfolk, VA

Dr. Iftekharuddin (Khan) first reached out to me in 2014 in the hopes of securing research subjects with an autism spectrum disorder, but he gained so much more. His Ph.D. student worked on a project to assess facial recognition and eye-tracking in an elegant way to diagnose and understand the complexity of autism better. Dr. Khan's steadfastness, support of his eager student, and gentle insistence for the project won me over instantly. He is the consummate humble professor who listens more than he speaks. I consider him an outright friend and scholarly mentor who grasps the understanding of collaboration and translational research while remaining grounded in the human condition. He has impacted my work and my research tremendously in the short time I have known him, as well as my research students and even my son.

John W. Harrington, Vice President of Quality/Safety and Clinical Integration, Vice-Chair of Primary Care, Division Director of General Academic Pediatrics, and Professor of Pediatrics at Children's Hospital of the Kings Daughters, Norfolk, VA

It is this topic of AI/ML which became the first theme of active collaboration between Jefferson Lab and Khan's team. Based on his group's expertise, the combined JLab-ODU team was quickly able to develop the methods to analyse signals produced by Superconducting Radio Frequency accelerating cavities of the CEBAF accelerator, and make automatic predictions of temporary failures (trips) of the cavities, which enable creating a new tool for improvements of reliability of CEBAF accelerator operation, enhancing performance of this Nuclear Physics microscope. The numerous and spectacular achievements of Prof Khan Iftekharuddin clearly demonstrate that he deserves the honor of receiving the State Council of Higher Education for VA faculty award.

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