

BOARD OF TRUSTEES
UNIVERSITY OF THE DISTRICT OF COLUMBIA

UDC Resolution 2016 -

SUBJECT: UDC School of Engineering & Applied Sciences Tenure Approval for Dr. Pawan Tyagi

WHEREAS, pursuant to 8B DCMR §1467, the School of Engineering & Applied Sciences (SEAS) Promotion Committee and Dean Devdas Shetty have determined that Dr. Pawan Tyagi qualified for the position of Associate Professor of Mechanical Engineering; and

WHEREAS, pursuant to 8B DCMR §1462, Dr. Pawan Tyagi has served as Assistant Professor at UDC since 2011, and is recognized by his students, fellow faculty members, administrators, and other experts in his field for his excellent teaching skills, track record of strong research activity, and contributions to undergraduate research involving students; and who has secured grants (currently totaling over \$ 1.2M) from agencies such as the National Science Foundation, Air Force Office of Sponsored Research (AFOSR) and Department of Energy (DOE), primarily in the research areas of nano-technology, easily recyclable metal based Solar cells, and additive manufacturing; and has authored more than 30 journal and conference papers, and whose publications have been cited 298 times according to Google Scholar®; and he has received five consecutive research excellence and scholarship awards from SEAS;

WHEREAS, Dr. Pawan Tyagi is also recognized for his collaborations and many contributions to the UDC community, including serving on numerous University committees, including the Institutional Review Board and on-line learning; and serving as a highly regarded mentor to undergraduates and graduate students, as well as leading a STEM (science, technology, engineering, and mathematics) grant and other efforts to actively recruit and retain UDC students for these fields; and serving on panels and as a reviewer for prestigious journals and organizations such as the Department of Energy, all of which has helped bring credit to UDC; and

WHEREAS, pursuant to 8B DCMR §§ 1468 and 1470 the Dean, the Chief Academic Officer and the President have affirmed the recommendation of tenure for Dr. Tyagi and the President has forwarded the recommendation for tenure to the Board of Trustees;

NOW, THEREFORE BE IT RESOLVED that the Board of Trustees of the University of the District of Columbia approves the award of tenure to Dr. Pawan Tyagi of the School of Engineering & Applied Sciences.

Submitted by Academic and Student Affairs

July 12, 2016

Approved by the Board of Trustees

July 26, 2016

Elaine A. Crider
Chairperson of the Board



FISCAL IMPACT STATEMENT

TO: The Board of Trustees
FROM: Managing Director of Finance *David L. Franklin*
DATE: July 8, 2016
SUBJECT: Tenure Approval for Professor Pawan Tyagi

Conclusion

It is concluded that there is no fiscal impact associated with the granting of tenure to Professor Pawan Tyagi in the School of Engineering & Applied Sciences (SEAS) at the University of the District of Columbia (UDC).

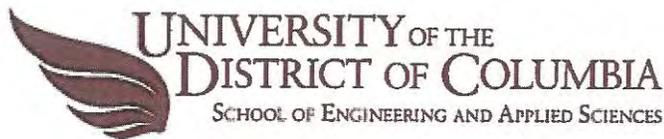
Background

Dr. Pawan Tyagi has served as Assistant Professor at UDC since 2011, and is recognized by his students, fellow faculty members, administrators, and other experts in his field for his excellent teaching skills, track record of strong research activity, and contributions to undergraduate research involving students. Professor Tyagi is also recognized for his collaborations and many contributions to the UDC community, including serving on numerous University committees and serving as a highly regarded mentor to undergraduates and graduate students, as well as leading a STEM (science, technology, engineering, and mathematics) grant.

The recommendation of tenure for Professor Pawan Tyagi has been affirmed by the Dean, Chief Academic Officer, and President.

Financial Impact

This request has been approved based upon the information provided. There are no anticipated risks at this time.



Office of the Dean

May 2, 2016

Dr. Rachel Petty,
Provost,
University of the District of Columbia,
4200, Connecticut Avenue, NW,
Washington DC

Ref: Dr. Pawan Tyagi - Recommendation regarding Promotion to Associate Professor with Tenure

I have the pleasure of strongly supporting Dr. Pawan Tyagi's application for promotion to the rank of Associate Professor of Mechanical Engineering along with tenure.

Dr. Tyagi received his Ph.D. in Material Science and Engineering from the University of Kentucky in 2008 specializing in nanotechnology and solar energy harvesting. Earlier, he had received his Bachelor Degree from the prestigious Indian Institute of Technology (IIT) Roorkee. Thereafter, Dr. Tyagi went on to earn two years industrial experience in a metallurgical plant that produced components for aerospace to biomedical implants. He received coveted certification from the American Society for Nondestructive Testing.

To follow his dream, Dr. Tyagi pursued further study and secured 17th national rank in the entrance exam to attend the prestigious IIT Kanpur, India in 2000 to pursue an MS degree with full scholarship. After obtaining his MS, he worked as a graduate research assistant at the University of Kentucky from 2002 to 2008. He was a Post-Doctoral Fellow at Johns Hopkins University and researched in the area of nanotechnology-based biomedical devices and biosensors. Dr. Tyagi also taught as an adjunct faculty at Johns Hopkins University to graduate level renewable energy courses. Dr. Tyagi joined the University of the District of Columbia in 2010, first as a Visiting Associate Professor of Mechanical Engineering and later as an Assistant Professor. In summary, Dr. Tyagi came to UDC with a rich industrial, teaching, and research background.

I have summarized his contributions to UDC in the areas of teaching, service and scholarly activities. I have also highlighted his scholarly contributions to the field of Mechanical Engineering.

Research:

Dr. Tyagi's research contribution is evidenced by the array of research grants and publications. He has clearly demonstrated that he can set up the requisite state of the art facilities to

conduct his research by winning grants from prestigious federal agencies like National Science Foundation, Air Force Office of Sponsored Research (AFOSR) and Department of Energy (DOE). I must note that it is unusual for a young assistant professor to lead such grant efforts in a short time. His research and teaching contributions to UDC has been in the following areas:

- Nanotechnology: Nano electronics, Nanospintronics, Nanoscale materials for thermal energy.
- Energy: Easily recyclable metal based Solar cells and solar thermal energy systems
- Additive manufacturing: Electrochemistry based metal additive manufacturing, surface modification, and adding intelligence to critical 3D printed components
- Work force development: Nuclear energy, renewable energy, smart grid, additive manufacturing,

Dr. Tyagi's research focuses on making a quantum leap from the current state of the art in the spintronics area. It is noteworthy, that due to spintronics the present day computer memory devices have improved several thousand times and all of us are using spintronics in smart devices and computers. Dr. Tyagi is concentrating on harnessing quantum spin state of molecular nanomagnets for developing next generation of computer devices, solar cells, and biomedical sensors. If successful, this will be an extremely useful contribution in the area of computer technology, renewable energy, and medical devices. UDC will benefit tremendously from Dr. Tyagi's research. It must be noted that Dr. Tyagi is one of the very few researchers who is continuing research in the very challenging yet highly transformative and cutting edge molecular spintronics field.

He made the noteworthy contribution in the field of molecular nanomaterial-based devices, which is widely discussed as a potential technology to revolutionize futuristic computers. Dr. Tyagi also has the vision to utilize the same device for developing novel spin photovoltaic cells. This topic is of special interest for funding agencies like Department of Energy. Dr. Tyagi is also leading UDC's nanotechnology based biomedical device research. Dr. Tyagi's has utilized commercially successful tunnel junctions as a vehicle for developing molecular electronics and molecular spintronics devices. This approach overcomes the limitations of conventional Molecular Spintronics device fabrication approaches. Dr. Tyagi has published ten peer-reviewed journal publications in this area.

Due to extreme computational challenges no prior theoretical study has investigated the role of magnetic molecules on ferromagnetic electrodes of molecular spintronics devices. Dr. Tyagi has come up with an innovative solution to solve this issue. Over the last five years, he and his students have developed a brand new C++ computer program to simulate and model the properties of Molecular Spintronics device. The novelty and value of his work has been appreciated by the National Science Foundation.

Since 2012, Dr. Tyagi has diversified his research portfolio and entered in the area of renewable energy and additive manufacturing. At present, with the help of multiple federal funding he is conducting research in the area of molecular spintronics, renewable energy, and additive manufacturing. Dr. Tyagi's has been associated with numerous grants as tabulated below,

\$200,000	National Science Foundation: A Monte Carlo and SQUID Magnetometer Study of Molecular Spintronics Devices (as a PI)
\$400,000	Sub-award to UDC from Department of Energy-National Nuclear Security Agency. Work Force Development in the Advance Manufacturing (as a PI)
\$200,000	Air force Office of Sponsored Research. Sputtering Machine and Atomic Force Enabled Molecular Spintronics and Nanomachining Research at University of the District of Columbia (as a PI)
\$42,000	Instrumentation grant from provost office Dye sensitized solar cell working as a lithium ion battery (as a PI)
\$400,000	National Science Foundation Targeted Infusion proposal on: Course development for a 21 st Century Smart Grid Workforce. (as a Co-PI)
\$200,000	National Science Foundation –ATE grant: Nanotechnology Education and Workforce Development” (as a senior personnel)
\$400,000	National Science Foundation Targeted Infusion proposal on: Course development for Renewable Energy Concentration (as senior personnel).

He is the author of several journal and conference papers, including publications from the American Society of Mechanical Engineers. He has published more than 19 journal papers and numerous peer-reviewed conference papers. His research contributions have appeared in leading journals such as Journal of Nanoparticle Research, Journal of Material Science and Processes, Journal of Material Chemistry and others. According to Google Scholar® Dr. Tyagi's publications have been cited 293 times. He is also highly ranked by the Research Gate.net, which has the global membership and tracks the importance of research using online algorithm. The external experts in his field have also provided comments about the quality of Dr. Tyagi's research.

External reviewer Dr. John Philip notes, *“My support letter is based on the impact and quality of research that Dr. Tyagi is leading in the area of spintronic devices. It must be noted that Nobel Prize winning discovery in the area of Giant Magneto Resistance type spintronics devices has revolutionized the computer memory technology. His research finding can provide a strong foundation for UDC to be recognized as a high-quality research institution.”* External reviewer, Dr. Satilmis Budak from Alabama A&M University, notes that *Dr. Tyagi has made the remarkable contribution in the field of molecular nanomaterial-based devices. Utilizing molecules in the devices for computer memory and logic units can lead to phenomenal changes in computer technology. However, the biggest challenge has been to connect two metal leads to a target molecule(s) and develop a robust and versatile device fabrication technology that can be adopted for commercial scale mass production*

Dr. Tyagi has worked closely with his students at UDC, supervising many undergraduate research projects that have resulted in publications and awards at national conferences. For his contributions to undergraduate student research, Dr. Tyagi has been commended by the

department and school. So far Dr. Tyagi has received five consecutive research excellence and scholarship awards from SEAS during our annual award and recognition ceremonies.

Teaching

I have observed Dr. Tyagi to be an exceptional teacher, who has the ability to interact with students, identify their real potential, and guide them to their goals. He thoroughly prepares for his classes and conducts interactive and engaging lectures. He always engages students by posing thought-provoking questions and encourages them to ask questions. He is an example of scholar-teacher and motivates excellence in his students. The evidence of this is found in numerous projects and presentation with the students, including student presentations at the US Congress and participation in a White House event. Dr. Tyagi not only works closely with his students in the classroom but is also genuinely interested in their wellbeing outside the classroom, helping them in pursuing internships and choosing career paths.

Also, Dr. Tyagi was a Myrtilla Minor Faculty Fellow at UDC in 2012-2013 and 2015-2016. He used this training to provide the additional training program to other faculty members to become innovative teachers. He recently initiated a new student-active teaching approach namely; student presentation based effective teaching (SPET) to teach medium sized highly technical courses. This approach addresses the limitations of popular active teaching approaches such as peer interaction based teaching and highly suitable for technical electives. In spring 2016, his SPET approach was one of the topics of MMFF's research at UDC and was utilized by six fellows to experience new effective teaching methodology. Dr. Tyagi and Learning Resource Division (LRD) are compiling a manuscript for peer-reviewed publication about the application of Dr. Tyagi's teaching methodology for different types of courses

It is noteworthy that Dr. Tyagi has also published a peer-reviewed publication in the IMECE-ASME in 2014. To date, he has conducted three university-wide workshops on effective teaching for faculty members. He participated in numerous community service activities. The most notable activity that brought credit to UDC is his continued involvement with Johns Hopkins University summer program at UDC. This program had been in existence for six years and attracted top high school students from the USA and foreign countries like Spain, France, Britain, South Africa, and UAE, etc. to the UDC campus. Dr. Tyagi has introduced STEM to nearly 140 high school students to date. He also published his insights about the effectiveness of this program in American Society of Engineering Education-Mid-Atlantic conference, Temple University in 2012.

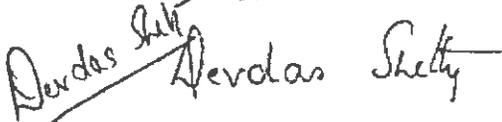
Dr. Tyagi has become recognized on our campus for his skills and innovation in project-based learning. He is highly sought after as a mentor by undergraduate students. Dr. Tyagi has mentored 11 undergraduate students. He is always mentoring a few students outside of class in independent and novel research projects, which culminate in written reports, publications, and conference presentations. Dr. Tyagi has mentored UDC students to publish in high impact factor journals. Dr. Tyagi has taken five students to four international conferences and meetings to provide them exposure to cutting-edge science and technology.

University Service

Dr. Tyagi has served on many committees at UDC. At the college level, Dr. Tyagi started the ASME student chapter at UDC and had been its faculty advisor. At the department level, he has served on the graduate and undergraduate committees and was heavily involved in the preparation of the ABET report for the Mechanical Engineering department, which resulted in a successful review from ABET in 2015. Since last five years, Dr. Tyagi is chair of the mechanical engineering curriculum committee. Dr. Tyagi is also the coordinator for the mechanical engineering's external advisory board and regularly conduct advisory board meeting for the continuous improvement of the mechanical engineering department. Dr. Tyagi has also served as the member of IRB committee for three years and participated in the faculty selection committees. To popularize mechanical engineering department, Dr. Tyagi has contributed in the website content for the prospective students. Also, Dr. Tyagi is supporting the preparation of Memorandum of Understanding between SEAS, UDC, and other US community colleges to ensure a good influx of students to sustain a good enrollment. He has been an active member of ASME and has served as a reviewer for many ASME journals and conferences including the editorship of International Journal of Energy. Dr. Tyagi has also served as panelist and reviewer for the National Science Foundation and has been a judge at many national conferences and meetings.

Dr. Tyagi contributions have brought credit to UDC. Dr. Tyagi is the type of teacher-scholar UDC should be proud of. He has met the scholarly, teaching and service requirements for promotion and tenure. I believe advancement to the rank of Associate Professor in Mechanical Engineering with Tenure is warranted for Dr. Tyagi and carries my positive recommendation.

Sincerely,



Devdas Shetty, Ph.D., P.E.
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