BOARD OF TRUSTEES

UNIVERSITY OF THE DISTRICT OF COLUMBIA

UDC Resolution 2016 -

SUBJECT: UDC School of Engineering & Applied Sciences Tenure Approval for Dr. Nian Zhang

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

WHEREAS, pursuant to 8B DCMR §1462, Dr. Nian Zhang has served as Assistant Professor at UDC since 2009, and is recognized by her students, fellow faculty members, administrators, and other experts in her field for her excellent teaching skills and contributions to undergraduate and graduate students' research (including Outstanding Research Mentorship Award, the Excellence in Teaching Award, and Excellence in Research Award from SEAS in 2014, 2015, and 2016); for a track record of strong research activity in the areas of computational intelligence, clustering algorithm for big data computing and its application in robotics, pollution monitoring and evaluation of engineering surfaces; for having received several grants and major awards, including two prestigious National Science Foundation grants (totaling $600,000 as a principal and co-principal investigator); and for having published to-date more than 60 peer-reviewed conference publications and 14 journal papers, including several of the top journals in the field of electrical and computer engineering;

WHEREAS, Dr. Nian Zhang is also recognized for her collaborations and many contributions to the UDC community, including chairmanship of curriculum committees, graduate committees, enrollment committee, and online learning committee; single-handedly hosting the international winter workshop of the IEEE (Institute of Electrical & Electronics Engineers) on Computation Computational Intelligence and Big data and Neural Network at UDC, involving the participation of more than 100 international leading experts and industry personnel; 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. Nian Zhang, 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. Nian Zhang 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

UNIVERSITY OF THE DISTRICT OF COLUMBIA
1851

FISCAL IMPACT STATEMENT

TO: The Board of Trustees

FROM: Managing Director of Finance

DATE: July 8, 2016

SUBJECT: Tenure Approval for Professor Nian Zhang

Conclusion

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

Background

Dr. Nian Zhang has served as Assistant Professor at UDC since 2009, and is recognized by her students, fellow faculty members, administrators, and other experts in her field for her excellent teaching skills and contributions to undergraduate and graduate students' research. She possesses a track record of strong research activity in the areas of computational intelligence, clustering algorithm for big data computing and its application in robotics, pollution monitoring and evaluation of engineering surfaces. Dr. Zhang is also recognized for her collaborations and many contributions to the UDC community, including chairmanship of curriculum committees, graduate committees, enrollment committee, and online-learning committee.

The recommendation of tenure for Professor Nian Zhang 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.

P5 enclosed.

UNIVERSITY OF THE DISTRICT OF COLUMBIA
SCHOOL OF ENGINEERING AND APPLIED SCIENCES

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. Nian Zhang - Recommendation regarding Promotion to Associate Professor with Tenure

I have the pleasure of strongly supporting Dr. Nian Zhang's candidacy for promotion to the rank of Associate Professor of Electrical and Computer Engineering with tenure.

Dr. Zhang received her Ph.D. from Missouri University of Science & Technology in Computer Engineering in 2004, having completed a Master's degree from Huazhong University of Science & Technology and Bachelor's degree from Wuhan University of Technology in Electrical Engineering. She worked as Assistant Professor in the Department of Electrical and Computer Engineering, South Dakota School of Mines & Technology (SDSM&T), Rapid City, SD from 2004 to 2009 and Assistant Professor of Electrical and Computer Engineering, University of the District of Columbia (UDC), Washington, D.C. She worked as a summer fellow at the Naval Research Laboratory, Washington, D.C both in 2013 and 2014. I have summarized her teaching, service and scholarly activities and her contributions to the field of Electrical and Computer Engineering. Dr. Zhang has exemplary achievements in all the three areas of teaching, scholarship and university service.

Research

Dr. Zhang's research contribution is evidenced by the array of research grants and publications. She has a strong record of research accomplishments. There are four areas of Dr. Zhang's work that need to be highlighted.
(1) Storm water pollution monitoring
(2) Surface roughness evaluation of engineering surface
(3) Computational Intelligence: Clustering algorithm for big data computing
(4) Robotic Navigation and a new algorithmic approach to detect targets in challenging environment

1. **Storm water pollution** is one of most important issues that the District of Columbia faces. Urban storm water pollution can be a large contributor to the water quality

problems of many receiving water, as runoff transports a wide spectrum of pollutants and their cumulative magnitude is large. Dr. Zhang proposed an algorithm that was based on recurrent neural network on the water quantity prediction. A hybrid learning algorithm was developed by her, which included particle swarm optimization and evolutional algorithm. The excellent experimental results demonstrated that the proposed method provides a suitable prediction tool for the storm water runoff.

2. **Machine Vision: Surface roughness** is a critical quality index which determines the quality of machined surfaces for engineering applications. Surface roughness prediction has very important applications in manufacturing industries, environmental sciences, and military applications. Dr. Zhang developed an effective least squares support vector machine (LS-SVM) based approach to predict the surface roughness in machined surface. The promising experimental results demonstrated that the proposed LS-SVM based predictive model has superior prediction performance to the analysis of variance (ANOVA) method and the neural networks model trained by Levenberg-Marquardt algorithm, which ensure an accurate prediction of surface roughness.

3. **Computational Intelligence: Clustering algorithm for big data computing.** Recent advances in modern technologies, such as infrared remote sensing technology, 4D CT-scans technology, and DNA microarrays have led to the proliferation of massive and imbalanced data. The imbalanced data sets are pervasive in real-world data-intensive applications, ranging from civilian applications such as cancer diagnoses and financial industry. Dr. Zhang developed a new method combining the principal component analysis and clustering algorithm to analyze the high dimensional and highly overlapped data. Her work contributed to the creation of efficient algorithms for achieving dimensional reduction and clustering on the high dimensional and imbalanced data set.

4. The main issue in mobile robots is **robot navigation** in an uncertain and complex environment. Dr. Zhang created a new fuzzy logic method to implement behavior-based control. To overcome the complex terrain, a hybrid fuzzy logic controllers was proposed to find multiple targets with smooth path. By combining the searching abilities of these two fuzzy logic controllers, the robot is no longer trapped in a narrow exit, but succeeds in following the wall to the exit and then resumes the navigation to the target. She made significant contributions by demonstrating that the robot beat conventional fuzzy logic controller method in various challenging terrains.

Her research is evidenced by a variety of grants and publications. Out of the fourteen journal papers, five of her publications are considered as top journals in the field of electrical and computer engineering. She has more than sixty peer-reviewed conference publications. Major grants received by her include two prestigious National Science Foundation Grants of $200,000 as the main PI and $ 399,991, where she was a co- principal investigator. She has also received several internal and external grants.

One of her external evaluators, Dr. Haibo He ,Ph.D. and Robert Haas Endowed Chair Professor at the University of Rhode Island talks about her contribution to electrical and computer engineering. He narrates, *"Dr. Zhang's research has made major contributions to the **Big Data** field by addressing the overlapped data separation, feature selection, and swarm intelligence self-organizing learning methods. These studies are used to answer some open questions such as "can you design an effective approach that could learn from any data with different imbalanced ratio?" Dr. Zhang's* research will lay solid grounds for the long-term research in imbalanced learning".

Teaching

Dr. Zhang has worked closely with her students at UDC, supervising many undergraduate and graduate research projects that have resulted in publications and awards at national conferences. I have observed Dr. Zhang to be an excellent teacher, who has the ability to interact with students, identify their real potential, and guide them to their goals.

She has consistently received an overall composite rating of 4/Exceptional Performance each year she has worked at UDC. She thoroughly prepares for her classes and conducts interactive and engaging lectures. For her dedication to teaching and outstanding performance, Dr. Zhang received several awards. These included *Outstanding Research Mentorship award, the Excellence in Teaching and Mentoring Award* from the School of Engineering and Applied Sciences in 2014 and 2015. In addition, Dr. Zhang was a *Myrtilla Minor Faculty Fellowship* which helped her to enhance her teaching and mentoring skills at UDC.

University Service

Dr. Zhang has served on many college committees and UDC committees. The committees include Chairmanship of curriculum committees, graduate committees, enrollment committee, and online learning committee with high level of success. At the regional and national level, she has served in numerous local and regional conferences and promoted the involvement of students at the national level. She had been a regular reviewer of the grant proposals from National Science Foundation, Institution of Electrical and Electronics Engineering (IEEE) research grant proposals and also reviewer of papers in her profession.

The School of Engineering and Applied Sciences was really impressed when she single handedly hosted a National/International Winter Workshop on IEEE Computation Computational Intelligence and Big data and Neural Network at the newly built student center at UDC. This conference had the participation of more than 100 international leading experts and industry personnel in the area of electrical and computer engineering. The results of the conference were highly useful in defining the trends and orientation of computational intelligence in the United States.

Dr. Zhang's contributions have brought credit to UDC. Dr. Zhang is the type of teacher scholar UDC should be proud of. I believe she has met the scholarly, teaching and service requirements for promotion to the rank of Associate Professor with Tenure. **I strongly support promotion of Dr. Nian Zhang to the position of Associate Professor with tenure.**

Sincerely,

Devdas Shetty

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