

PROMOTION RECOMMENDATION
The University of Michigan
College of Engineering
Department of Electrical Engineering and Computer Science

Laura K. Balzano, assistant professor of electrical engineering and computer science, Department of Electrical Engineering and Computer Science, College of Engineering, is recommended for promotion to associate professor of electrical engineering and computer science, with tenure, Department of Electrical Engineering and Computer Science, College of Engineering

Academic Degrees:

Ph.D.	2012	University of Wisconsin, Electrical and Computer Engineering, Madison, WI
M.S.	2007	University of California, Electrical Engineering, Los Angeles, CA
B.S.	1998	Rice University, Electrical and Computer Engineering, Houston, TX

Professional Record:

2013 – present	Assistant Professor, Department of Electrical Engineering and Computer Science, University of Michigan
2012	Visiting Researcher, Electrical and Computer Engineering, Duke University and University of Wisconsin, Madison, WI

Summary of Evaluation:

Teaching: Professor Balzano has established an outstanding record of classroom teaching. At the undergraduate level, she led a substantial re-design of EECS 351 Digital Signal Processing by introducing several modern topics to the syllabus and designing a final project that students find highly engaging. She has taught a total of four courses, including two at the graduate level, and has regularly received very high evaluations, especially in recent offerings. She has further demonstrated a willingness to give students individual attention that is above and beyond the norm, while challenging them to maximize their potential. As a graduate student mentor, she has fostered a healthy and productive environment for her graduate students. Professor Balzano has graduated one Ph.D. student with another seven in progress (two expected to graduate this year). She has also supervised one master's student and two post-doctoral researchers.

Research: Professor Balzano's contributions to research are strong. Her work on subspace tracking with missing data is widely known, based on work she completed as a Ph.D. student and significant extensions she developed independently while on the faculty at Michigan. She has made several other noteworthy contributions to statistical signal processing and machine learning, including her work on matrix completion, subspace clustering, and heteroschedastic principal component analysis. Professor Balzano has a reputation for tackling challenging, fundamental problems, and is highly regarded as a speaker at workshops and conferences. Her research program is well-funded by external grants including young investigator awards from AFOSR and the Army Research Office, and she has demonstrated the ability to mentor Ph.D.

students toward the completion of their degree. She has built several collaborations and her research exhibits a healthy mix of theoretical and applied projects. She has several highly-cited publications (including seven cited over 100 times) and an overall h-index of 23, which is very good for her field and career stage.

Recent and Significant Publications:

- L. Balzano, Y. Chi, Y. Lu, “A Modern Perspective on Streaming PCA and Subspace Tracking: The Missing Data Case,” *Proceedings of IEEE*, 2018: 17 pages, Accepted, in press.
- J. He, L. Balzano, A. Szlam, “Incremental Gradient on the Grassmannian for Online Foreground and Background Separation in Subsampled Video,” *Proc. Int. Conf. Computer Vision and Pattern Recognition*, 1568-1575, 2012.
- L. Balzano, S. Wright, “Local Convergence of an Algorithm for Subspace Identification from Partial Data,” *Journal for Foundations on Computational Mathematics*, 15(5): 1279-1314, 2015.
- G. Ongie, L. Balzano, R. Nowak, R. Willett, “Algebraic Variety Models for High-Rank Matrix Completion,” *Proc. International Conference on Machine Learning*, 10 pages, 2017.
- D. Hong, L. Balzano, J.A. Fessler, “Asymptotic performance of PCA for high-dimensional heteroscedastic data,” *Journal of Multivariate Analysis*, 21 pages (2018).

Service: Professor Balzano’s internal service contributions demonstrate excellent citizenship. She has served her division as a contributing member of the graduate admissions committee. She has also been an active advisor to students majoring in Computer Engineering. She has made noteworthy contributions to diversity via her involvement with Wolverine Pathways, serving on an MSTEM panel, mentoring and serving as an advisor to the Girls in EECS student group. Her external service contributions demonstrate a position of trust in her field. She has taken an active role in reviewing for many flagship journals, and has actively participated in conference technical and program committees as well as in the organization of special sessions and workshops.

External Reviewers:

Reviewer A: “I am very impressed by Laura, both by her research and her teaching, and think promotion to Associate Professor with tenure is well deserved.”

Reviewer B: “It is impossible for me to imagine a better colleague than Laura. She is clever, inquisitive, curious and eager to collaborate. She is also a fantastic lecturer, demonstrating a clarity of thought and exposition that is almost unparalleled in the community. ...I believe she would be promoted [at my institution] without any problem whatsoever.”

Reviewer C: “...Prof. Balzano has made many important contributions to signal processing and machine learning, and is recognized internationally for these contributions. ...Therefore, in my opinion, Prof. Balzano is an outstanding candidate for tenure and promotion.”

Reviewer D: “Specifically, her work focuses on scenarios (inspired by modern applications) where ‘noise’ corresponds to ‘completely missing (and more)’ observations. For example, imagine half of the words of this letter are erased and now you are trying to reconstruct what I

wrote! This has become one of the defining challenges of modern statistics, machine learning and [sic] signal processing community – at the intersection of disciplines mentioned above – and Laura’s impressive work is smack in the middle of it.”

Reviewer E: “Laura’s paper, *Global Convergence of a Grassmannian Gradient Descent Algorithm for Subspace Estimation*, combines the results from the *Local convergence* paper with the analysis of an initial convergence phase starting from the random initialization, is a *tour de force* achievement. ... You are lucky to have Laura Balzano and should promote her without hesitation and try to hold on to her as long as you can.”

Summary of Recommendation: Professor Laura Balzano has demonstrated an outstanding commitment to teaching, has cultivated a strong research program with international visibility, and has exhibited excellent citizenship within her department. It is with the support of the College of Engineering Executive Committee that I recommend Laura K. Balzano for promotion to associate professor of electrical engineering and computer science, with tenure, Department of Electrical Engineering and Computer Science, College of Engineering.



Alec D. Gallimore, Ph.D.
Robert J. Vlastic Dean of Engineering
College of Engineering

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