

PROMOTION RECOMMENDATION  
The University of Michigan  
College of Literature, Science, and the Arts

Dominika K. Zgid, assistant professor of chemistry, College of Literature, Science, and the Arts, is recommended for promotion to associate professor of chemistry, with tenure, College of Literature, Science, and the Arts.

Academic Degrees:

Ph.D.	2008	Waterloo University
B.S.	2003	Warsaw University

Professional Record:

2012 – present	Assistant Professor, Department of Chemistry, University of Michigan
2011 – 2012	Post-doctoral Associate, Columbia University
2008 – 2011	Post-doctoral Associate, Cornell University

Summary of Evaluations:

Teaching – Professor Zgid has taught CHEM 260/261 and CHEM 571. She was energetic in teaching CHEM 260/261 and had developed approximately 30 new chemical demonstrations for the course, which is a remarkable commitment. Student evaluations of her courses have been consistently in the range of four out of five. These scores are comparable to other faculty teaching the courses. Besides her classroom teaching, she has also mentored a large number of graduate student instructors and two post-doctoral fellows assigned to teach with her. The latter is important because many of these “teaching post-docs” go on to faculty positions where their training here is critical to their success. Professor Zgid has successfully mentored five graduate students, four post-doctoral scholars, and six undergraduate students in her laboratory. Overall, she has an excellent teaching record.

Research – Professor Zgid is a theoretical physical chemist, who has developed the “self-energy embedding theory” (SEET), which merges Green’s function methods with quantum chemistry concepts to perform ab initio electronic structure calculations on molecules and solid-state materials that contain many d- and f-electrons (e.g., materials that contain transition metals). Such materials are encountered in important technologies, such as batteries, superconductors, and magnetic materials. Their electronic structure governs the useful properties of these materials. The ability to accurately calculate structures is a long sought goal that could allow rational design of new materials. Prior methods for calculating structures are either inaccurate or so computationally intense that they are impractical. Professor Zgid has proven that SEET is accurate in a series of benchmarks establishing its potential for many useful applications. Her theoretical developments are highly creative and her productivity and funding success are excellent.

Recent and Significant Publications:

“Communication: The description of strong correlation within self-consistent Green’s function second-order perturbation theory,” with J. J. Phillips, *Journal of Chemical Physics*, 140, 2014, p. 241101.

“Rapid communication: Systematically improvable multiscale solver for correlated electron systems,” with A. A. Kananenka and E. Gull, *Physical Review B*, 91, 2015, p. 121111(R).  
“Communication: Towards ab initio self-energy embedding theory in quantum chemistry,” with T. N. Lan and A. A. Kananenka, *Journal of Chemical Physics*, 143, 2015, p. 241102.  
“Testing self-energy embedding theory in combination with GW,” with T. N. Lan, et al., *Physical Review B*, 2017, p. 155106.

Service – Professor Zgid has performed satisfactory service for her rank. She served several years on the graduate student recruiting and admissions committees. She has engaged in extensive outreach, including the development of workshops for girls as part of the FEMMES (Females Excelling More in Math, Engineering and Sciences) program. She has organized five conferences or workshops, including the Midwest Theoretical Chemistry Conference (Ann Arbor, 2015) and two Telluride workshops (2016, 2017).

#### External Reviews:

##### Reviewer (A)

“Her research is world-class, focusing on pragmatic approaches to the electronic structure of strongly correlated systems. She has published very good papers in excellent journals, and her level of grant funding (two career awards) is extremely high. ...I very enthusiastically fully support this promotion and grant of tenure.”

##### Reviewer (B)

“I would say she is one of the strongest candidates in the world for the current career stage. ...given her success in grants, publications and invited talks, it is clear that her work is well respected in the field.”

##### Reviewer (C)

“...her work begins to address one of the most important intellectual problems in the DMFT field. ... in the last few years she has developed a compelling, independent, narrative of her research, and I believe there is every reason to expect that it will continue to be a compelling narrative for the future.”

##### Reviewer (D)

“In my opinion, her most important contributions have been in the related areas of strong correlation, embedding theory, and the extension of advanced quantum chemical methods to materials... In all three areas, her work has been both original and impactful, in spite of the fact that the competition in the field is fierce, to say the least. ...she has defended her work eloquently and effectively.”

##### Reviewer (E)

“Professor Zgid is one of the most innovative theoretical chemists [in her cohort] in the US. ... The great innovative breakthrough is to recognize that for the types of chemical and materials systems of interest, the separation into strongly and weakly correlated species cannot be readily accomplished by traditional electronic structure methods and then developing a practical method for implementing this idea. I am not aware of any other electronic structure theorist who has made this very important leap.”

Reviewer (F)

“I consider Dr. Zgid to be one of the brightest rising stars in the theoretical chemistry. She has already distinguished herself by her creative independent work at the University of Michigan and I expect her to continue to deliver high-quality high-impact work. ...Dr. Zgid has become a recognized leader and trailblazer in the area of strongly correlated extended systems.”

Reviewer (G)

“By nearly every measure, Dominika’s pre-tenure period at Michigan has proven to be a success. ... And perhaps most importantly, she has established a leadership role in the field: Dominika is unquestionably regarded as being among the best...electronic structure theorists in the nation...”

Reviewer (H)

“She is among the top ten or twenty scientists in the field of strong correlation and embedding. ... I would be very happy if Dr. Zgid would be a candidate for promotion at [my institution]...and would do everything in my power to get her promotion and tenure.”

Reviewer (I)

“More so than general productivity (where she has been very impressive) or funding/awards (again Dominika has done very well in this regard), we hope that the...scientists we hire have a signature achievement before they come up for tenure. Many excellent and successful candidates do not, but Dominika does.”

Summary of Recommendation:

Professor Zgid has become a world leader in her research field. She has been an outstanding teacher in the classroom and has provided valuable mentoring for future teachers. Her excellent service and outreach have included work with girls, recruiting graduate students, and organizing conferences. The Executive Committee of the College of Literature, Science, and the Arts and I recommend that Assistant Professor Dominika K. Zgid be promoted to the rank of associate of chemistry, with tenure, College of Literature, Science, and the Arts.



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Andrew D. Martin, Dean  
Professor of Political Science and Statistics  
College of Literature, Science, and the Arts

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