

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

Nicolai Lehnert, associate professor of chemistry, with tenure, and associate professor of biophysics, without tenure, College of Literature, Science, and the Arts, is recommended for promotion to professor of chemistry, with tenure, and professor of biophysics, without tenure, College of Literature, Science, and the Arts.

Academic Degrees:

Ph.D.	1999	Johannes Gutenberg University, Mainz Germany
Diploma	1995	Heinrich-Heine-University Düsseldorf, Germany

Professional Record:

2014 – present	Associate Professor, Program in Biophysics; University of Michigan
2012 – present	Associate Professor, Department of Chemistry, University of Michigan
2006 – 2012	Assistant Professor, Department of Chemistry, University of Michigan
2001 – 2006	Habilitation, Christian-Albrechts-University Kiel, Germany
1999 – 2001	Post-doctoral Research Fellow, Stanford University

Summary of Evaluations:

Teaching – Professor Lehnert has been an excellent and versatile teacher. Student evaluations are routinely above the average for his undergraduate courses, including large introductory courses. He recently developed a new course, “Introduction to Bioinorganic Chemistry,” which has become popular for the growing Biomolecular Sciences major offered by the Department of Chemistry. Professor Lehnert has also been active in extending the education mission in other ways. In particular, he developed an outreach program that recruited students from Cass Tech to come to the university for several weeks over the summer to perform research in his and other laboratories. These students then presented their research at a graduate student symposium. The program was recognized as providing confidence and boosting the interest of these students in chemistry. In recognition of his strong teaching record, the college presented Professor Lehnert with the Individual Award for Outstanding Contributions to Undergraduate Education in 2014.

Research – Professor Lehnert’s field of research is bioinorganic chemistry with projects related to metalloproteins, nitric oxide, and bio-inspired catalysts. He has been highly productive, publishing 28 papers in high quality journals since his last promotion. One important finding was his development of a bio-inspired cobalt-based catalyst that interacts with graphene to produce hydrogen. Such catalysts may provide novel approaches for clean energy. A highly significant study was his development of an enzyme model that performs reactions that add electrons to nitric oxide and other species to form nitrogen or ammonia. Studies in this area have been stymied by the inability to make a small synthetic model that can function similar to the actual enzyme. Such “models” allow detailed study of the mechanism of the reaction. Professor Lehnert was the first to successfully make such a model system, which had long been sought by other researchers. This major accomplishment was published in the *Journal of the American Chemical Society* in 2013. Professor Lehnert’s research has also provided novel insight into non-heme iron interactions with nitric oxide (NO), a molecule important in a variety of functions such as controlling blood pressure. In these papers, he developed a model of non-heme Fe that binds to NO that is stable yet able to catalyze a reduction of NO. His study provided insight into the mechanism of the reaction and showed how Fe is used to activate NO for further biochemical reactions. Again, the structure and

insights had long been sought so it can be considered a breakthrough in the field of bioinorganic chemistry. His success is due to his near unique ability to combine synthesis, spectroscopy, and computational modeling for such studies.

Recent and Significant Publications:

- “The functional model complex $[\text{Fe}_2(\text{BPMP})(\text{OPr})(\text{NO})_2](\text{BPh}_4)_2$ provides insight into the mechanism of flavodiiron NO reductases,” with S. Zheng, et al., *Journal of the American Chemical Society*, 135, 2013, pp. 4902-4905.
- “Characterization of a high-spin non-heme $\{\text{FeNO}\}_8$ complex: Implications for the reactivity of iron nitroxyl species in biology,” with A. L. Speelman, *Angewandte Chemie International Edition*, 52, 2013, pp. 12283-12287.
- “Facile heterogenization of a cobalt catalyst via graphene adsorption: Robust and versatile dihydrogen production system,” with S. C. Eady, et al., *Chemical Communications*, 50, 2014, pp. 8065-8068.

Service – Professor Lehnert has performed valuable service for the department, university, and scientific community. For several years he has been an active and high quality chair of the Chemistry Graduate Committee. This committee oversees the academic progression of 250 chemistry graduate students, recommends policy, and helps resolve conflicts or problems. He also redesigned the inorganic group brochure and website providing a welcome aid to recruiting graduate students. He also developed a good portfolio of service for the broader scientific community. He has organized several symposia and been involved in National Institutes of Health and National Science Foundation (NSF) advisory panels. Professor Lehnert obtained funding for and led an NSF workshop on the relation of food supply to nitrogen cycle chemistry entitled “Feeding the World in the 21st Century: Grand Challenges in the Nitrogen Cycle.” Such workshops may be initiated by the principal investigator or by the NSF and are often used to set funding priorities and spark work in particular areas.

External Reviewers:

Reviewer (A)

“He has taken a previously reported diiron complex and realized it could be modified and used to prepare dinuclear complexes with an $(\text{Fe}-\text{NO})_2$ core (paper #84). ... These findings are impressive and really had a strong impact on the field. ... Professor Lehnert has been quite productive since his last promotion... His visibility is high in bioinorganic chemistry and he has gained the respect of the community. ... As you can tell, I am enthusiastic about this case. Professor Lehnert is a first-class scientist who I anticipate will have a long and productive career.”

Reviewer (B)

“...Nicolai Lehnert is an outstanding scientist whose work has had a major impact on the fields of inorganic and bioinorganic chemistry. His research is known to be of the highest quality, and he also shows strong productivity. As a result of the impact of his scholarly work along with his service to the community, he has achieved international prominence.”

Reviewer (C)

“...he has been highly productive in research... His papers have appeared in the top journals of his field... Among his important advances are studies in which he reports the first functional model complex for flavodiiron NO reductase and the first non-heme iron-HNO complex. These results will provide important benchmarks for understanding the properties of the natural enzymes that carry out

molecular transformations involving NO... I strongly recommend that Professor Nicolai Lehnert be promoted to Full Professor.”

Reviewer (D)

“Professor Lehnert has a strong publication record, and the body of work has continued to be strong, both in terms of the numbers and the journal quality, during the past three years since his promotion to tenure. ... Notably, Professor Lehnert’s work is funded by two simultaneous grants from [sic] the chemistry division of the NSF, which is relatively rare. I am also impressed by the new directions in his research interests...”

Reviewer (E)

“Nicolai is well known for his research and writings in the area of bioinorganic chemistry related to the interactions of nitric oxide with iron-containing proteins. ... What distinguishes Nicolai’s research and writing from the crowd is an excellent combination of scholarly rigor, deep understanding of spectroscopy and the ability to convey that expertise to a broader audience. His papers always have a point beyond just reporting the new results.”

Reviewer (F)

“For me, this promotion case is a ‘no-brainer,’ in favor of promotion, as soon as possible. Since his promotion to Associate professor with tenure, only about 3 years ago, Dr. Lehnert has published ~25 papers, most in top peer-reviewed journals... This is incredible productivity for this time period; very impressive. ...Dr. Lehnert is an outstanding inorganic chemist, who has contributed greatly to one of the important and contemporary sub-areas of bioinorganic chemistry. He is gifted in having the background and expertise to apply a multi-pronged approach to research problems, all in his own labs... Dr. Lehnert is a leader...”

Summary of Recommendation:

Professor Lehnert has been remarkably productive and successful in research, teaching, and service. He has made several breakthroughs in bioinorganic chemistry. He has developed new courses and been an effective and appreciated teacher. His outreach program to Cass Tech is recognized as high value. Finally he has held leadership positions in the department and in his field with success. The Executive Committee of the College of Literature, Science, and the Arts and I recommend that Associate Professor Nicolai Lehnert be promoted to the rank of professor of chemistry, with tenure, and professor of biophysics, without tenure, College of Literature, Science, and the Arts.



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

May 2016