Approved by the Regents
May 16, 2024

PROMOTION RECOMMENDATION
The University of Michigan
College of Pharmacy

Timothy A. Cernak, assistant professor of medicinal chemistry, College of Pharmacy, and assistant professor of chemistry, College of Literature, Science, and the Arts, is recommended for promotion to associate professor of medicinal chemistry, with tenure, College of Pharmacy, and associate professor of chemistry, without tenure, College of Literature, Science, and the Arts.

Academic Degrees:

Ph.D.	2007	McGill University, Montréal, QC
B.S.	2002	University of British Columbia Okanagan, Kelowna, BC

Professional Record:

2018 – present	Assistant Professor, Department of Medicinal Chemistry, College of Pharmacy, University of Michigan
2018 – present	Assistant Professor, Department of Chemistry, College of Literature, Science, and the Arts, University of Michigan
2021 – 2022	Co-Founder and Chief Scientific Officer, Iambic Therapeutics (formerly Entos), La Jolla, CA
2014 – 2018	Associate Principal Scientist, Merck Research Laboratories, Boston, MA
2009 – 2013	Senior Scientist, Chemistry, Merck & Co., Rahway, NJ

Summary of Evaluation:

Teaching: Professor Cernak is passionate about his role as an educator. His enthusiasm and commitment make him an outstanding teacher who strives to fully engage learners and inspire their curiosity and confidence through innovative methods. Professor Cernak carries a higher-than-average teaching load within his department and has made substantial efforts to enhance student learning through novel experiential teaching. To-date, he has published one instructional manuscript featuring these efforts in the *Journal of Chemical Education* ("Interactive Python Notebook Modules for Chemoinformatics in Medicinal Chemistry"), and an additional manuscript is in progress. Student feedback on Professor Cernak's teaching is universally positive and includes comments praising his ability to engage and inspire them and clearly explain complex concepts. Professor Cernak is very devoted to mentoring students and trainees in his laboratory, as well. Nearly 30 graduate students from Chemistry, Chemical Biology, and Medicinal Chemistry have rotated through his laboratory to date, 11 of whom have joined for their thesis work. Professor Cernak has mentored 13 undergraduates, 17 post-doctoral fellows, and 14 staff members, and he has served on more than 40 doctoral thesis committees. His trainees have been successful in securing external fellowships under his mentorship, and those who have graduated have gone on to post-doctoral positions at highly regarded institutions and careers in industry or academia.

Research: Professor Cernak is a rising star in the field of medicinal chemistry as one of an emerging cadre of outstanding scientists at the forefront of investigating how high-throughput experimentation (HTE) and artificial intelligence can be used to improve the way chemists design and study reactions and synthesis. The interdisciplinary partnerships he has established, combined with his own vision and expertise, have dramatically enhanced the impact of the envisioned interface of chemical synthesis and data science. Professor Cernak has a remarkable record of external funding to support his work, including an NIH R01, NSF Career Award, Gates Foundation Award, Janssen and Millipore Sigma Postdoc Collaboration awards, a Sloan Research Fellowship, and a $3M Schmidt Futures Award. He co-founded Iambic Therapeutics (formerly Entos) in collaboration with three national/international colleagues, and they successfully raised an impressive $53M to bring the integration of artificial intelligence and chemistry into the commercial realm. Since joining the University of Michigan in 2018, Professor Cernak has published 17 very high impact papers in journals including: *Science*, *Nature*, *Nature Communications*, *Nature Synthesis*, *Journal of the American Chemical Society*, and *Angewandte Chemie*. He also published four papers from previous work, two in *Science* and one in *Nature*. According to Google Scholar, his papers have been cited more than 4,000 times. He has also applied for three patents while at Michigan. Professor Cernak has established a national and international reputation, having given over 80 invited lectures all over the world (53 since joining Michigan, 15 of which were international). He has been invited to speak at some of the most prestigious conferences including the Medicinal Chemistry Gordon Research Conference and the Winter Alpine Conference on Synthetic and Medicinal Chemistry. He has consulted for companies spanning many industries and has been invited to present his work at artificial intelligence focus groups at the National Academy of Sciences, the Food and Drug Administration, and the National Institutes of Health.

Recent and Significant Publications:

Y. Lin, R. Zhang, D. Wang, T. Cernak. Computer-Aided Key Step Generation in Alkaloid Total Synthesis. *Science*. 2023, 379, 453–457.

B. Mahjour, Y. Shen, W. Liu, T. Cernak. A Map of the Amine–Acid Coupling System, *Nature*. 2020, 580, 71–75.

Y. Shen, J.E. Borowski, M.A. Hardy, R. Sarpong, A.G. Doyle, T. Cernak. Automation and computer-assisted planning for chemical synthesis. *Nature Reviews Methods Primers*. 2021, 1(23).

E. Shim, J.A. Kammeraad, Z. Xu, A. Tewari, T. Cernak, P. Zimmerman. Predicting Reaction Conditions from Limited Data Through Active Transfer Learning. *Chemical Science*. 2022, 13, 6655–6668.

B. Mahjour, Y. Shen, T. Cernak. Ultrahigh-Throughput Experimentation for Information-Rich Chemical Synthesis. *Accounts of Chemical Research*. 2021, 54(10), 2337–2346.

Service: Professor Cernak is an outstanding citizen of the university and his profession. He has served on numerous committees in the Departments of Medicinal Chemistry and Chemistry, including leadership responsibilities for faculty and student recruitment, and he was a delegate to National Taiwan University as part of a collaboration with the College of Pharmacy. Professor Cernak is engaged in outreach efforts in northern Michigan, as well as outreach activities for younger students, including development and presentation of his Wellpaint™ teaching toy that engages elementary-aged kids in chemistry. As a recognized leader in the scientific community,

he serves on the scientific advisory board for Drug Discovery Unit in the UK and on the advisory board for the Open Reaction Database Initiative by Google. He is on the editorial advisory board for *Organic Letters* and has been invited to serve as a reviewer for numerous federal and international grant sponsors and journals, including high impact journals, such as *Science* and *Nature*. He was given the 2021 American Chemical Society Petroleum Research Foundation Outstanding Reviewer Award and received a variety of employee excellence and innovation awards during his time at Merck.

External Reviewers:
Reviewer A: "Dr. Cernak's CV package is one of the very best of the several hundred packages I have seen over the years…Very few academics have the combined skill sets and depth of understanding he has in organic synthesis, medicinal chemistry, high throughput experimentation and data management…his program is especially innovative and creative…The impact of his program has been profound…The 2023 Science paper will go down as a landmark study illustrating how computational design combined with machine learning can be used to identify streamlined synthesis of complex targets. Indeed, the level of sophistication in these papers is extremely high – more of what you would expect from a mature full professor rather than a rising assistant professor."

Reviewer B: "Dr. Cernak has also clearly achieved a very high profile in his scientific community... Cernak's article on C(sp3)-C(sp2) cross coupling has been viewed >26,000 times in less than six months, which is many-fold more views than a typical synthetic methods article published in this journal and attests to the enormous interest in his new method."

Reviewer C: "Thus, Cernak has gained all the funding and grown the group one would expect and more for such a promotion, has published in high-level journals a mix of infrastructure development, concepts, and some tangible results…I think he has positioned himself to be one of a few people who will generate a body of work in this area combining methods and ML in the future."

Reviewer D: "Tim represents an exciting new type of innovator in the field of synthetic chemistry…Tim stands out as a rare example of a synthetic chemist who transitioned from a nearly decade-long career in the private sector (Merck, 9y) to academia at a research-focused, large university. Such a transition requires heavy doses of creativity, intellect, passion, and courage; attributes Tim possesses in spades."

Reviewer E: "…Prof. Cernak, in my view, is far ahead of everyone in this area…Cernak's group is a leader in showing how these tools might be helpful and how they might be applied to tackle real challenges…It is easy to see the HTE approach being further accelerated and it should apply to reactions for which the mechanism is more unclear. This is a big deal!...Prof. Cernak has a distinctive, world-leading program in an area of chemistry that is poised for growth. If you want a faculty member in this area, I am not sure who you would want instead!"

Summary of Recommendation: Professor Cernak is an exemplary scientist and extremely dedicated teacher, mentor, and citizen of his profession. He is a nationally and internationally recognized scientist at the forefront of investigating how high-throughput experimentation and artificial intelligence can be used to change how chemists design and study reactions and synthesis. It is with great pleasure that we recommend Timothy A. Cernak for promotion to associate professor of medicinal chemistry, with tenure, College of Pharmacy, and associate professor of chemistry, without tenure, College of Literature, Sciences, and the Arts.

Vicki L. Ellingrod, PharmD, FCCP, FACNP
Dean
John Gideon Searle Professor, Professor of Pharmacy
Professor of Psychiatry
College of Pharmacy

Anne Curzan, Dean
Geneva Smitherman Collegiate Professor of English Language and Literature, Linguistics, and Education
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May 2024