

PROMOTION RECOMMENDATION
The University of Michigan-Flint
College of Arts and Sciences
Department of Mathematics

Howard M. Thompson, assistant professor of mathematics, Department of Mathematics, College of Arts and Sciences, is recommended for promotion to associate professor of mathematics, with tenure, Department of Mathematics, College of Arts and Sciences.

Academic Degrees:

Ph.D.	2002	University of California-Berkeley, California
B.S.	1984	University of California-Irvine, California

Professional Record:

2009-Present	Assistant Professor of Mathematics, University of Michigan-Flint
2006-2009	Assistant Professor, Spring Arbor University, Ann Arbor, Michigan
2002-2006	Assistant Professor (<i>non tenure-track</i>), University of Michigan, Ann Arbor

Summary of Evaluation:

Teaching – Professor Thompson faced some initial challenges with student responses to his teaching because he believes that students learn mathematics best “by doing” rather than by watching, whether alone, in groups, or with a coach on the side. He committed himself to finding a pedagogy that retained his high standards and active learning approaches while creating an environment in which students felt supported and encouraged to learn mathematics. Through a variety of trials and reflection, Professor Thompson came upon an approach in Fall 2013 which involved adoption of the WebWork online homework system which seemed to resonate with students. The results of his efforts to match his pedagogies with student expectations are apparent in his recent student evaluations, peer observations, and an alumni survey which identify Professor Thompson as an effective teacher, especially in small group and one-on-one interactions. He also actively contributes to departmental learning assessment, academic advising, and to mentorship of capstone student presentations, suggesting he has reached a mature state of teaching proficiency both inside and outside of the classroom.

Research – Professor Thompson’s research is in the field of algebraic geometry, an area of pure mathematics that is known to be particularly challenging to master. His scholarship focuses on multiplier ideals and toric varieties and lies at the intersection of three broad subfields of mathematics: algebraic geometry, combinatorics, and convex geometry. His work, both before arriving at the University of Michigan-Flint and since, has had significant influence on other scholarship, with one reviewer noting his work on multiplier ideals is “original and influential, and well recognized among other researchers in the field” and another noting, “Dr Thompson’s mathematics is characterized by its elegance.” His invitations to high level research seminars and workshops is further evidence of his contributions to his field.

Recent and Significant Scholarly Activity:

Peer-Reviewed Articles

- Thompson, Howard M. (2015). "Multiplier Ideals of Monomial Space Curves II." Accepted for publication by the *Journal of Pure and Applied Algebra*.
- Thompson, Howard M. (2014). "Multiplier Ideals of Monomial Space Curves." *Proceedings of the American Mathematical Society*, Series B 1, 33-41.

Invited Workshop Presentations

- Thompson, Howard M. "The Commutative Algebra of Singularities in Birational Geometry: Multiplier Ideals, Jets, Valuations, and Positive Characteristic Methods." Mathematical Sciences Research Institute, May 6-10, 2013.
- Thompson, Howard M. "Commutative Algebra." Mathematical Sciences Research Institute, August 20 to December 21, 2012.
- Thompson, Howard M. "Relating Test Ideals and Multiplier Ideals." American Institute of Mathematics Research Conference Center, August 8-12, 2011.

Invited Conference Presentation

- Thompson, Howard M. "Multiplier Ideals of Certain Binomial Ideals." American Mathematical Society Special Session on Toric Algebraic Geometry and Beyond, Akron, Ohio, October, 2012.

Service – Professor Thompson presents a significant and balanced service record across the Department of Mathematics, the college, and his profession. One of the most important aspects of that service has been the implementation and coordination of the WebWork online homework system in the department. In addition, he has directed the math tutorial lab, chaired the Awards and Scholarship Committee, assisted with the annual statewide Math Field Day and served as the undergraduate math program co-coordinator. At the college level, he has served as a semester-long sabbatical replacement member on three foundational college committees: Academic Standards, Curriculum, and Admissions and Scholarships. His service as an editorial reviewer to multiple journals and a book series is an important way to contribute to mathematics as a discipline. Overall, Professor Thompson is a good citizen of the academic community and a valued colleague within his department and profession.

External Reviewers:

Reviewer (A): "I would also remark that he has a couple of unpublished notes on the theory of toric varieties that can be found on ArXiv... .. These papers are also of interest and have been cited by several important authors... .. The papers... ..revolve around the theory of *toric varieties*... ..he generalizes parts of the theory. To do so he has to go very deep into the theory down to its foundations... ..the quality of the publications is on par... ..he is more than capable to produce more interesting results..."

Reviewer (B): "However, the multiplier ideals are quite difficult to compute even aided by computers. Having a combinatorial way of computing them, in specific cases such as the

monomial curves case, simplifies their computation greatly. Dr. Thompson's results have been implemented into computer algebra systems by Z. Teitler, and form a very helpful tool for the other researchers in the area... .. The most outstanding paper of Dr. Thompson, in my opinion, is the one jointly written with K. Smith... .. The attempts to generalize this type of result... ..to higher dimensional geometry have led to many recent papers on high level mathematics... .. There is usually a lower number of papers published per researcher in this area [algebraic geometry] compared with other pure mathematical disciplines... .. The field is perceived as being very difficult to master."

Reviewer (C): "Howard's papers... ..deal with multiplier ideals... .. This area of algebraic geometry is very different from toric varieties and indicates the kind of scholarly growth one hopes to see [of his generation] researcher."

Reviewer (D): "Thompson... ..has a good mathematician energy... ..published papers by H. Thompson are of good quality within the standard average in algebraic geometry, specially item (3) [Irrelevant Exceptional Divisors for Curves on a Smooth Surface]... .. Finally, the contribution of H. Thompson to the progress of research in algebraic geometry has been relevant and I expect that he will continue in this way."

Reviewer (E): "In my opinion this (*Contemporary Mathematics*, 2007)... ..is the most outstanding and influential paper of Thompson. It plays an important role in the PhD dissertations... It is on the base of many recent papers on the study multiplier ideals on algebraic surfaces... ..Thompson's work on multiplier ideals is original and influential, and well recognized among other researchers in the field."

Reviewer (F): "Of the three published papers, two are published in high quality journals: the *Journal of Algebra* aims to be the top subject journal in the broad field of algebra... ..The *Proceedings of the American Mathematical Society* is a high quality journal devoting to publishing shorter papers... ..Other objective indicators [of scholarly work] include invitations to conferences and seminars, and Thompson has a reasonable number of such invitations."

Reviewer (G): "The most impactful publication in his papers is the joint work with Karen Smith, 'Irrelevant Exceptional Divisors for Curves on a Smooth Surface.' In this paper they proved the contributions of exceptional divisors to the jumping numbers which are induced from multiplier ideals. This is a very timely publication and attracted many people's interests."

Reviewer (H): "The short preprint 'Fan is to Monoid as Scheme is to Ring: A Generalization of the Notion of a Fan' has also been influential... .. In summary, Dr Thompson's mathematics is characterized by its elegance."

Reviewer (I): "Multiplier ideals are very important in algebraic geometry, yet at the same time are difficult to compute, and any new examples are a real contribution to the literature... .. This work [Smith and Thompson, 2007] stands out among Dr. Thompson's other publications as being particularly well written and well cited, with 10 citations in other published papers and five review citations on MathSciNet... .. The culture within algebraic geometry is for researchers to have fewer publications than peers working in other mathematical subdisciplines... .. Dr. Thompson

has an impressive record of attendance at high-level research workshops... ... These workshops are events that bring the very top researchers in the field together, and the workshops in Banff and at AIM are by invitation only, and usually limited to about 40 people.”

Reviewer (J): “Howard’s research is of very high quality, is published (or will be published) in good refereed journals, has had an impact on the mathematical community, and shows versatility and wide-ranging technical expertise.”

Summary of Recommendation:

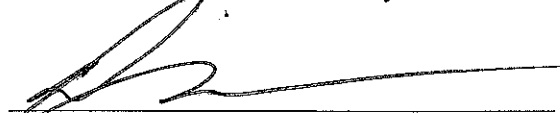
Since joining the Department of Mathematics, Professor Thompson has established a record of pedagogical adaptability while maintaining high standards for student performance in his teaching and a record of valuable service to his department, college, and profession. His work in algebraic geometry has advanced the field significantly, and his ideas are important to leading researchers. The majority of the departmental review committee, the majority of the college Executive Committee, and I feel that he has met the threshold for tenure and promotion in teaching, scholarship, and service. With enthusiasm and pride, I therefore recommend that Howard M. Thompson be promoted to associate professor of mathematics, with tenure, Department of Mathematics, College of Arts and Sciences.

Recommended by:

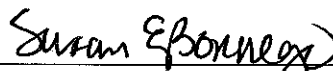


Susan Gano-Phillips, Dean
College of Arts and Sciences

Recommendation endorsed by:



Douglas G. Knerr, Provost and
Vice Chancellor for Academic Affairs



Susan E. Borrego, Chancellor
University of Michigan-Flint

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