Peder Thompson

Curriculum Vitae (updated 9/2022)

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Employment

Assistant Professor of Mathematics, Niagara University (NU)	8/2021 – present
Postdoctoral Fellow, Norwegian University of Science and Technology (NTNU)	9/2018 – 8/2021
Postdoctoral Research Associate, Texas Tech University (TTU)	9/2016 – 8/2018
Graduate Teaching Assistant, University of Nebraska–Lincoln (UNL)	9/2010 – 7/2016

Education

Ph.D. Mathematics, advised by Mark Walker, University of Nebraska–Lincoln, USA	5/2016
M.A. Mathematics, University of Nebraska–Lincoln, USA	5/2012
B.A. with honors, Mathematics, English literature, Augustana University, SD, USA	5/2010

Publications (peer reviewed)

17. [with L. W. Christensen and S. Estrada] *Five theorems on Gorenstein global dimensions.* arXiv preprint: 2203.12375, **Contemporary Mathematics**, to appear.

16. [with L. W. Christensen, N. Ding, S. Estrada, J. Hu, and H. Li] *The singularity category of an exact category applied to characterize Gorenstein schemes*, **The Quarterly Journal of Mathematics**, to appear.

15. [with D. Jorgensen and L. Şega] *Asymptotic behavior of Ext for pairs of modules of large complexity over graded complete intersections.* arXiv preprint: 2012.10670. **Mathematische Zeitschrift**, (2022).

14. [with L. W. Christensen and S. Estrada] *Gorenstein weak global dimension is symmetric*, **Mathematische Nachrichten**, 294 (2021), no. 11, 2121–2128.

13. [with P. A. Bergh] *Matrix factorizations for self-orthogonal categories of modules*, **Journal of Algebra and its Applications**, 20 (2021), no. 3, 21 pp.

12. [with K. Shultis] *Reducibility of parameter ideals in low powers of the maximal ideal*, **Contemporary Mathematics**, 773 (2021), 181–193.

11. [with L. W. Christensen and S. Estrada] *The stable category of Gorenstein flat sheaves on a noetherian scheme*, **Proceedings of the American Mathematical Society**, 149 (2021), no. 2, 525–538.

10. [with L. W. Christensen, S. Estrada, L. Liang, D. Wu, and G. Yang] *A refinement of Gorenstein flat dimension via the flat–cotorsion theory*, **Journal of Algebra** 567 (2021), 346–370.

9. [with T. Nakamura] *Minimal semi-flat-cotorsion replacements and cosupport*, **Journal of Algebra** 562 (2020), 587–620.

8. [with L. W. Christensen and S. Estrada] *Homotopy categories of totally acyclic complexes with applications to the flat–cotorsion theory*, **Contemporary Mathematics** 751 (2020), 99–118.
7. [with A. Croll, R. Dellaca, A. Gupta, J. Hoffmeier, V. Mukundan, D. Rangel Tracy, L. Şega, G. Sosa] *Detecting Koszulness and related homological properties from the algebra structure of Koszul homology*, **Nagoya Mathematical Journal** 238 (2020), 47–85.
6. [with L. W. Christensen] *Pure-minimal chain complexes*, **Rendiconti del Seminario Matematico della Universitá di Padova** 142 (2019), no. 1, 41–67.
5. *Minimal complexes of cotorsion flat modules*, **Mathematica Scandinavica** 124:1 (2019), 15–33.
4. *Cosupport computations for finitely generated modules over commutative noetherian rings*, **Journal of Algebra** 511 (2018), 249–269.
3. [with M. Brown, C. Miller, M. Walker] *Adams operations on matrix factorizations*, **Algebra & Number Theory** 11 (2017), no. 9, 2165–2192.
2. [with M. Brown, C. Miller, M. Walker] *Cyclic Adams operations*, **Journal of Pure and Applied Algebra** 221 (2017), no. 7, 1589–1613.
1. *Stable local cohomology*, **Communications in Algebra** 45 (2017), no. 1, 198–226.

Submitted preprints

18. [with L. W. Christensen and L. Ferraro] *Rigidity of Ext and Tor via flat–cotorsion theory.* arXiv preprint: 2112.00103. Submitted.
19. [with H. Lindo] *The trace property and preenveloping classes.* arXiv preprint: 2202.03554. Submitted.

Bachelor thesis students (sole advisor)

Andreas Palm Sivertsen, NTNU 2020
Thesis: *Introduction to Commutative Ring Theory, from Localization to Complete Intersections*, 28 pp.

Tor Kringeland, NTNU 2019
Thesis: *Maximal Cohen-Macaulay modules and the singularity category*, 30 pp.

Ole Berre, NTNU 2019
Thesis: *On the tensor product, and defining* $\mathrm{Tor}_n^R(-,N)$, 29 pp.

Grants

$1,000: Academic Innovation Fund grant for *Student Mathematics Colloquium*, PI 5/2022
Internal grant at NU - awarded for Fall 2022.

$5,200: Summer Research Award 5/2022
Internal grant at NU - awarded for Summer 2022.
Project title: *Categorical and higher dimensional intersection theory*

$1,000: Academic Innovation Fund grant for *Student Mathematics Colloquium*, PI 11/2021
Internal grant at NU - awarded for Spring 2022.

\$1,000: Academic Innovation Fund grant for *Student Mathematics Colloquium*, PI 10/2021
Internal grant at NU - awarded for Fall 2021.
\$16,500: NSF funding for *Workshop: Structures on Free Resolutions*, PI 10/2017
National Science Foundation, award number DMS-1743011
A 3 day conference and workshop, 16th TTU Red Raider Mini-Symposium
Funding supported travel and lodging expenses for 40 participants
\$750: *Mathematics Research Communities travel grant*, PI 5/2016
American Mathematical Society, one-time collaboration grant
Covered travel expenses for 1 week research collaboration at Gonzaga University

Fellowships

STEM Teaching, Engagement & Pedagogy (STEP) Fellowship 8/2017 – 5/2018
Participated in one-on-one mentoring and classroom evaluations at TTU to improve student success through evidence-based instructional practices.
Mentoring Through Critical Transition Points (MCTP) Fellowship 1/2015 – 8/2015
Awarded by the UNL mathematics department, this fellowship is designed to support education through research involvement.
Graduate Assistance in Areas of National Need (GAANN) Fellowship 9/2013 – 8/2014
Awarded by the UNL mathematics department, this U.S. Department of Education fellowship allows graduate students time to focus on research.

Conferences organized

Conference organized: *Structures on Free Resolutions*, Lubbock, TX 10/2017
Co-organizer (with L. W. Christensen), 16th Red Raider Mini-Symposium at TTU
AMS special session: *Homological Methods in Commutative Algebra*, Denton, TX 9/2017
Co-organizer (with A. Wheeler) for a special session at the AMS Sectional meeting

Invited talks

(*) indicates delay and/or online format due to COVID19 pandemic.

Conference talks (20–45 minutes)

Trace modules and the Gorenstein property, Aalto University, Finland 8/2022*
Nordic Congress of Mathematicians, commutative and homological algebra session
Rigidity of Ext and Tor via minimal semi-flat-cotorsion replacements, Savannah, GA 6/2022
Conference on Homological Commutative Algebra and Related Topics
Trace modules and enveloping classes, Joint Mathematics Meetings, Seattle WA 4/2022*
AMS Special Session: Commutative Algebra
Minimal semi-flat-cotorsion replacements and cosupport, Tufts University 3/2022*
AMS Special Session: Homological Methods in Commutative Algebra
Symmetry of Gorenstein global dimensions, Tromsø, Norway 1/2022*
Mørketidens Mattemøte: a meeting on algebra and its friends
Relating matrix factorizations and totally acyclic complexes, Denver, CO 1/2020
Joint Mathematics Meetings, Special Session on Commutative Algebra
Stable categories of Gorenstein flat modules, San Francisco State University, CA 10/2018
AMS Special Session: Homological aspects of comm. alg. & rep. theory
Pure-minimal chain complexes, Northeastern University, MA 4/2018
AMS Special Session: Homological Commutative Algebra

Cosupport: from origins to open questions, University of Arkansas, Fayetteville, AR 2/2018
Southwest Local Algebra Meeting (SLAM) 2018
Cosupport in a commutative noetherian ring, Washington State University, WA 4/2017
AMS Special Session: Commutative Algebra
Understanding structure: using support to classify subcategories, Lubbock, TX 8/2016
Colloquium talk at Texas Tech University
Stable local cohomology, Joint Mathematics Meetings, Seattle, WA 1/2016
AMS Special Session: Commutative Algebra (Mathematics Research Communities)
Stable local cohomology, Rutgers University, NJ 11/2015
AMS Special session: Aspects of Resolutions and Syzygies in Commutative Algebra
Stable local cohomology, University of Nebraska–Lincoln, NE 4/2015
KUMUNUjr conference
Three-dimensional visualization of trinomial inequalities 4/2010
Math on the Northern Plains, an undergraduate research conference

Seminar talks (1–2 hours)

Using totally acyclic complexes to extend work of Buchweitz into a non-affine setting 11/2020
CHAMP - Commutative and Homological Algebra Market Presentations, on Zoom
Trace modules and enveloping classes 3/2020
Algebra Seminar, Norwegian University of Science and Technology
Totally acyclic complexes and Gorenstein stable categories 4/2019
Algebra Seminar, Università di Verona, Italy
Minimal semi-flat-cotorsion replacements and cosupport 3/2019
Algebra Seminar, University of Copenhagen, Denmark
Totally acyclic complexes and stable categories 11/2018
Algebra Seminar, University of Murcia, Spain
Stable categories and Gorenstein flat modules 9/2018
Algebra Seminar, Norwegian University of Science and Technology, Norway
Using cyclic Adams operations to prove Serre's Vanishing Conjecture 9/2017
Algebra Seminar, University of Texas–Arlington
Cosupport in a commutative noetherian ring 11/2016
Algebra Seminar, Syracuse University
Computing Cosupport via Cotorsion-Flat Resolutions 4/2016
Commutative Algebra Seminar, Texas Tech University
Cosupport: a homological dual to support 4/2016
Commutative Algebra Reading Seminar, University of Nebraska–Lincoln
Stable local cohomology 3/2015
Commutative Algebra Seminar, University of Utah
Complete injective resolutions and their applications 3/2015
Graduate Algebra Seminar, University of Utah
Complete intersection dimension 1/2015
Commutative Algebra Reading Seminar, University of Nebraska–Lincoln
Stable local cohomology 10/2014
Commutative Algebra Seminar, University of Nebraska–Lincoln
Local cohomology, duality, and a proof of HLVT 2/2014
Commutative Algebra Reading Seminar, University of Nebraska–Lincoln
Flatness 11/2012
Commutative Algebra Reading Seminar, University of Nebraska–Lincoln

Fuzzy sets in focus: the fuzzification of group theory 3/2012
Graduate Student Seminar, University of Nebraska–Lincoln

Teaching

Courses taught at NU (Instructor of record)

MAT499: Senior Seminar / Topology Fall 2022
This topics course included a seminar on topology, a survey of mathematics literature, and an independent research project.
MAT228: Linear Algebra Spring 2022
MAT102: Introductory Statistics Spring 2022
Two sections, one aimed at students with low mathematical background.
MAT111: Calculus I, four sections Fall 2021 (x2), Fall 2022 (x2)

Courses taught at NTNU (Instructor of record)

MA8203: Algebraic Geometry / Algebraisk geometri Spring 2021
A doctoral degree program course.
MA8202: Commutative Algebra / Kommutativ algebra Spring 2020
A doctoral degree program course.
MA3201: Rings and Modules / Ringer og moduler Fall 2018, Fall 2019
A master's degree program course.

Courses taught at TTU (Instructor of record)

Math 3360: Foundations of Algebra I (Group & ring theory) Spring 2018
Math 2360: Linear Algebra Summer 2017, Fall 2017
Math 2450: Calculus III Fall 2017
Online Math 1300: Contemporary Math Spring 2017
Course taught online; recorded videos of mini-lectures.
Math 1300: Contemporary Math Fall 2016
A larger lecture section (93 enrolled).

Courses taught at UNL (Instructor of record unless indicated otherwise)

Math 203J: Contemporary Math Fall 2015, Spring 2016
Math 808T: Concepts of Calculus, Assistant Instructor Summer 2016
Math 896: Capstone Course, Assistant Instructor and advisor/mentor Summer 2016
Advised K-12 teachers in writing their master's theses.
IMMERSE, Bridge program to graduate school, Assistant instructor Summer 2015
Assisted pre-graduate students in the algebra portion of this program.
Math 300: Mathematics Matters Fall 2014
Math 101: College Algebra, Associate course convener & instructor Spring 2013
Wrote common exams and led weekly meetings for 15 sections.
Math 203: Contemporary Math Summer 2012
Math 221: Differential Equations Spring 2012
Math 103: College Algebra & Trigonometry, Course convener & instructor Fall 2011, Fall 2012
Coordinated instructors for 9 sections as convener in 2012.
Math 107: Calculus II, Recitation Instructor Summer 2011
Math 106: Calculus I, Recitation Instructor Fall 2010, Spring 2011

Other teaching experience

Curriculum development for Math 101 at UNL, Coordinator & developer — Summer 2013
Developed and wrote full lesson plan documents for Math 101 instructors.
Grader for Math 871 at UNL: Point-set Topology — Fall 2014
Tutor for UNL Math Resource Center, pre-college algebra to multivariable calculus. — 2010 – 2015

Professional development

Teaching development

Faculty Mentorship Program, Niagara University. — 2021 – 2022
Mentee in this year-long program to focus on teaching
UNYIBL Summer Workshop, via Zoom — July 2021
A one week workshop to discuss Inquiry Based Learning (IBL) teaching techniques

Workshops by invitation (1-2 week duration)

New Trends in Syzygies, Banff International Research Station, in Banff, Canada — 6/2018
Stable Cohomology: Foundations and Applications, in Snowbird, Utah — 5/2018
Math Research Community in commutative algebra, in Snowbird, Utah — 6/2015
MSRI summer school on Algebraic Topology, in Guanajuato, Mexico — 7/2014

Visits to other departments (1-2 week duration)

Università di Verona, Verona, Italy — 4/2019
University of Copenhagen, Copenhagen, Denmark — 3/2019
University of Murcia, Murcia, Spain — 11/2018
University of Missouri - Kansas City, Kansas City, Missouri, USA — 4/2018
Syracuse University, Syracuse, New York, USA — 11/2016
Gonzaga University, Spokane, Washington, USA — 5/2016
University of Utah, Salt Lake City, Utah, USA — 3/2015

Professional memberships

American Mathematical Society member — 2010 – present

Service

Service to the profession

Journal referee (40 articles) for journals such as: *Journal of Algebra*, *Journal of Pure and Applied Algebra*, *Pacific Journal of Mathematics*, *Journal of Algebra and its Applications*, *Rocky Mountain Journal of Mathematics*, *Journal of Commutative Algebra*, *Communications in Algebra*, *Algebras and Representation Theory*, and others	2016 – present
Reviewer for Mathematical Reviews *Written reviews for 11 articles and 1 book*	2017 – present
Workshop co-organizer, Structure on Free Resolutions, Lubbock, TX	10/2017
AMS special session co-organizer, Central sectional meeting, Denton, TX	9/2017
Letter writer for colleague tenure and promotion applications	2019 – present

Departmental service

NU: Coordinator for NUSTEP high school teachers in Calculus	Fall 2022
NU: 5 years Outcomes Assessment report, task member	Spring 2022
NU: Student Mathematics Colloquium, co-founder and co-organizer	2021 – present
NU: webmaster, editor of NU Mathematics Department website	2021 – present
NTNU: Algebra Seminar, organizer	2020 – 2021
NTNU: Representative for temporary algebra staff, for ULG	2020 – 2021
NTNU: internal examiner for bachelor theses	2019, 2021
UNL, TTU, NTNU: Reference letter writer for students	2015 – present
UNL: Commutative Algebra Reading Seminar, co-organizer	2014 – 2015
UNL: Graduate Advisory Committee, sole graduate member, appointed	2014 – 2015
UNL: GTA Orientation, Experienced GTA Panel	8/2012 – 8/2014
UNL: GTA Orientation, Classroom Management Panel	8/2013
UNL: Math Day volunteer (math bowl moderator, bowl timer, and van driver)	2010 – 2016