David J. Hemmer

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Department of Mathematics
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EDUCATION:

2001	Ph.D	Mathematics	University of Chicago
	Advisor:	*Jonathan L. Alperin*	
	Thesis:	*Extensions of hook and completely splittable modules for the symmetric group.*	
1997	M.S.	Mathematics	University of Chicago
1996	B.A.	Mathematics	Dartmouth College

EMPLOYMENT:

2012-Present	**Professor and Chairman**: **Department of Mathematics,** University at Buffalo, SUNY
2007- 2012	**Associate Professor and Mathematics Department Director of Undergraduate Studies (2009-12),** University at Buffalo
2008	**Member,** Mathematical Sciences Research Institute**,** Berkeley, CA
2003-2007	**Assistant Professor,** University of Toledo.
2001-2003	**NSF Postdoctoral Fellow,** University of Georgia
1996-2001	**NSF Graduate Fellow,** University of Chicago

GRANT SUPPORT:

Submitted 2017	**National Science Foundation** *Effects of Feedback on College Students' Math Outcomes, Co-PI, (PI: Lora Park, Psychology) $541,662*
2016-2019	**National Science Foundation** Grant #DMS 1551069 *EDT: Experiential Diversity in Graduate Education.* Co-PI, *(PI: William Menasco, Mathematics)* $594,292.
2011-2015	**National Science Foundation** Grant # DMS 1068783: *Connections between cohomology and representation theory of symmetric groups, braid groups, Hecke algebras, and algebraic groups.* Sole PI. $188,497.
2012-2014	**National Security Agency** Grant #H98230-12-0924 (Declined): *Connections between cohomology and representation theory of symmetric groups, braid groups, Hecke algebras, and algebraic groups.* Sole PI, $67,516.

2010-2012 **National Security Agency** Grant **#**H98230-10-0192: *Cohomology and representation theory for symmetric and algebraic groups,* Sole PI, $58,395.

2006-2010 **National Science Foundation** Grant # DMS 0556260: *Cohomology and representation theory*, Sole PI, $95,427.

2008 **Mathematical Sciences Research Institute** Member: Special semester on representation theory of finite groups and related topics, $10,000.

2004-2006 **National Security Agency** Grant # H98230-05-1-0023: *Modular representation theory and cohomology of the symmetric group and related objects*, Sole PI, $30,000.

2001-2004 **National Science Foundation** Grant # DMS0102019: *Modular representation theory of the symmetric group,* Postdoctoral Fellowship, $90,000.

1997-2001 **National Science Foundation** Graduate Research Fellowship, $90,000.

PUBLICATIONS :

Refereed Journals:

[21] David J. Hemmer, Jonathan Kujawa, "Signed Specht modules for symmetric groups," *in preparation*

[20] David J. Hemmer, "A Burnside-type theorem for exterior powers of symmetric group characters,"*in preparation.*

[19] David J. Hemmer and Naijiang Zeng. "Recognizing defect zero blocks of symmetric groups," submitted, 2017.

[18] Frederick R. Cohen, David J. Hemmer, Daniel K. Nakano, "The Lie module and its complexity" *Bulletin of the London Math Society*, **(48)** 2016, 109-114.

[17] "Frobenius twists in the representation theory of the symmetric group," *Proceedings of Symposia in Pure Mathematics*, **(86)** 2012 187-200.

[16] David J. Hemmer, "Realizing large gaps in cohomology for symmetric groups," *Algebra and Number Theory* **(6)** 2012 825-832

[15] David J. Hemmer, "A combinatorial approach to Specht module cohomology," *Algebra Colloq*. **(19)** (2012) *777-786*

[14] David J. Hemmer, “Stable decompositions for some symmetric group characters arising in braid group cohomology.” *Journal of Combinatorial Theory Series A,* **(118)** (2011) 1136-1139.

[13] Frederick R. Cohen, David J. Hemmer, Daniel K. Nakano, “On the cohomology of Young modules for the symmetric group,” *Advances in Mathematics* **(224)** (2010), *1419-1461.*

[12] Jon Carlson, David J. Hemmer, Nadia Mazza, “The group of endotrivial modules for the symmetric and alternating groups,” *Proc. Edin. Math. Soc.* (**53)** (2010) , 83–95.

[11] David J. Hemmer, “Cohomology and generic cohomology for Specht modules of the symmetric group,” *J. Algebra ,* **(322)** (2009), *1498-1515.*

[10] David J. Hemmer, "The complexity of certain Specht modules for the symmetric group," *Journal of Algebraic Combinatorics, **(30)*** (2009), *421-427.*

[9] David J. Hemmer, “Symmetric group modules with Specht and dual Specht filtrations,” *Communications in Algebra,* **35:11**, (2007) p. 3292 - 3306.

[8] David J. Hemmer, Daniel K. Nakano, “Cohomology of Specht modules,” *J. Algebra* **(306)** (2006), p. 191-200.

[7] David J. Hemmer, “Irreducible Specht modules are signed Young modules,” *J. Algebra* (**305**) (2006) p. 433-441.

[6] David J. Hemmer, Jonathan Kujawa, Daniel K. Nakano, “Representation Type of Schur Superalgebras,” *J. Group Theory,* **(9)** (2006) #3, p. 283-306.

[5] David J. Hemmer, “A row removal theorem for the Ext^1 quiver of symmetric groups and Schur Algebras,” *Proceedings of the American Mathematical Society*, (**133**) (2005), p.403-414.

[4] David J. Hemmer, “Fixed-point functors for symmetric groups and Schur algebras,” *J. Algebra,* **(280)** (2004), 295-312.

[3] David J. Hemmer, Daniel K. Nakano, “Specht filtrations for Hecke Algebras of Type A,” *Journal of the London Mathematical Society* (2), (**69)** (2004), 623-638**.**

[2] David J. Hemmer, Daniel K. Nakano, “Support varieties for modules over symmetric groups,” *Journal of Algebra*, (**252)** (2002), 422-440.

[1] David J. Hemmer, “The Ext^1 quiver for completely splittable representations of the symmetric group,” *Journal of Group Theory,* **(4)** (2001) #4, 401-416.

Conference Proceedings:

[C4] David J. Hemmer, “The Lie module and its complexity,” Mathematisches Forschunginstitut Oberwolfach Reports (2015), 2 pages.

[C3] David J. Hemmer, "A variety of approaches to Specht module cohomology," Mathematisches Forschungsinstitut Oberwolfach Reports, (2011), 3 pages.

[C2] David J. Hemmer, "Young modules for the symmetric group with large vanishing ranges in Cohomology," Mathematisches Forschungsinstitut Oberwolfach Reports, (2010) p. 35-37.

[C1] David J. Hemmer, "Tilting modules for symmetric groups?" Mathematisches Forschungsinstitut Oberwolfach Reports, (2006) p.937-40.

ADVISING:

Doctoral Students:

As Primary Advisor:

Aparna Upadhyay	Ph.D expected June 2018
Tara Hudson	Ph.D expected June 2018
Naijang Zeng	Ph.D expected February 2018.
Yin Su	Ph.D expected February 2018
Michael Rosas	Ph.D awarded June 2016.
Craig Dodge	Ph.D awarded June, 2012

As Committee Member:

Ruodan Liu	Ph.D expected June 2019, Advisor: Yiqiang Li
Renda Ma	Ph.D expected June 2019, Advisor: Yiqiang Li
Matthew Sartwell	Ph.D awarded June 2016, Advisor: Bernard Badzioch
Alyssa Brown	Ph.D awarded 2012, Advisor: Tom Cusick.
Lavinia Ciungu	Ph.D awarded 2010, Advisor: Tom Cusick.

Master's Student:

Leya Tesmenitsky, MS 2010, "Some new computations of Young module cohomology."

Undergraduate Senior Honors Theses:

Andrew Adair 2017-18
Joe Ricci BS 2/2012.
Graham Clenaghan 2010
Andrew Hughes 2008-2009
Fangya Tan 2008-2009
Ben Connell 2006-2007

TEACHING:

University at Buffalo

Fall 2017	Math 464/564	Topics in Combinatorial Analysis
Fall 2016	Math 141	Calculus I
Fall 2016	Math 353	Introduction to Combinatorics
Fall 2015	Math 461/561	Introduction to Lie Algebras and Representation Theory
Fall 2015	Math 241	Multivariable Calculus
Fall 2014	Math 141	Calculus I
Fall 2014	Math 353	Introduction to Combinatorics
Fall 2013	Math 561	Introduction to Representation theory
Spring 2013	Math 620	Abstract Algebra II
Fall 2012	Math 619	Abstract Algebra I
Spring 2012	Math 620	Abstract Algebra II
Fall 2011	Math 619	Abstract Algebra I
Fall 2010	Math 461/561	Introduction to Lie Algebras and Representation Theory
Fall 2009 :	Math 819	Representation Theory of Finite Groups
Spring 2009:	Math 620	Abstract Algebra II
	Math 142	Calculus II
Fall 2008	UE 141	Mathematics of Voting- Undergraduate Discovery Seminar
	Math 619	Abstract Algebra I
	Math 241	Calculus III
Fall 2007	Math 141	Calculus I
	Math 419	Introduction to Abstract Algebra

University of Toledo:

Honors Calculus I, II
Business Calculus
Honors Differential Equations
Introduction to Combinatorics (designed and taught)
Graduate Algebra Sequence
Graduate topics course in representation theory
Advanced linear algebra
Introduction to Abstract Algebra

University of Georgia:

Calculus I, II

University of Chicago:

Calculus I, II, III

Externally Funded Invited Talks:

- **Representation Theory of Symmetric Groups and Related Algebras,** National University of Singapore Institute for Mathematical Sciences, December 2017
- **Representation Theory of Symmetric Groups and Related Topics,** University of Kaiserslautern, Germany. February 2016.
- **Allegheny College,** Invited Lecture Series, "Permanents, Determinants and an Introduction to Representation Theory", October 2015.
- **Workshop on Gradings and Decomposition Numbers,** University of Stuttgart, September, 2012.
- **Cohomology and Support in Representation Theory,** University of Washington, August, 2012.
- **American Institute of Mathematics,** "Cohomology bounds and growth rates" workshop, June 2012.
- **New York Workshop on Symmetric Groups- Invited Speaker:** September 2011.
- **Southeast Lie Theory- Workshop Leader,** University of Virginia, June 2011.
- **Oberwolfach, Germany,** "A variety of approaches to Specht module cohomology," Conference on Representation Theory of Symmetric Groups, April 2011.
- **University of South Alabama:** "Frobenius twists for symmetric group module?" Colloquium, March 2011.
- **University of South Alabama:** "Generic cohomology for Specht and Young modules of the symmetric group", Algebra Seminar, March 2011.
- **Southwest Group Theory Day- Invited Speaker:** "Young modules for the symmetric group with large vanishing ranges in cohomology", November, 2010.
- **Oberwolfach, Germany,** "Young modules for the symmetric group with large vanishing ranges," Conference on Cohomology of Finite Groups, July 2010.
- **Southeast Lie Theory Conference- Invited Speaker: "**Vanishing ranges and Young module cohomology for symmetric groups," May 2010.
- **VIGRE Summer School: Homological Methods in Representation Theory:** Group leader, May 2010.
- **University of Oklahoma:** "A tour of symmetric group representation theory," Colloquium, April 2010.
- **University of Oklahoma:** "Signed Specht modules for symmetric groups?", Representation Theory seminar, April 2010.
- **University of Toledo,** Colloquium March 2009
- **Oberwolfach, Germany,** "The complexity and support varieties for some Specht modules of the symmetric group," Conference on Support Varieties, February 2009.
- **University of Virginia:** "A tour of symmetric group representation theory via Specht module filtrations." Colloquium, November 2008.
- **University of Virginia:** "An application of algebraic topology to computing cohomology for Young modules of the symmetric group." Algebra seminar, November 2008.
- **University of Chicago,** Group Theory Seminar, May 2008.
- **Mathematical Sciences Research Institute, "**An application of topology to computing the cohomology of Young modules for the symmetric group," Conference on homological methods in representation theory, April 1, 2008.
- **American Institute of Mathematics,** "An introduction to the cohomology and modular representation theory of the symmetric groups," Workshop on cohomology and representation theory for finite groups of Lie type: computational methods, June 2007.
- **University of Chicago,** Group theory seminar May 2006
- **Oberwolfach, Germany,** "Tilting modules for symmetric groups?" Conference on representation theory of finite groups, March 2006.

- **Ohio State University,** Group Theory Seminar, November 2005
- **Bowling Green University,** "Specht module filtrations for representations of the symmetric groups," Colloquium, October 2004**.**
- **AMS-IMS-Siam Summer Research Conference**, "Fixed point functors for symmetric groups and Schur algebras," Conference on Representations of Algebraic groups, quantum groups and Lie algebras," Snowbird, Utah, July 2004.
- **University of Chicago,** Group theory seminar April 2004
- **University of Toledo,** Colloquium, February 2003.
- **Wayne State University,** Colloquium, February 2003.
- **North Carolina State,** Algebra Seminar, February 2003.
- **University of South Alabama**, Colloquium, January 2003.
- **University of Chicago** Group Theory Seminar, April 2002
- **Dartmouth College,** "The Ext^1 quiver for completely splittable representations for symmetric groups," Colloquium**,** May 2001

Other invited talks

- **AMS Sectional Meeting,** Orlando, FL, September 2017
- **AMS joint annual meeting,** *Gelfand-Zetlin lattices in Specht modules for symmetric groups*.**,** January 2017.
- **AMS meeting,** The complexity of the Lie module, October 2015, Fullerton, CA.
- **Oberwolfach, Germany,** "The Complexity of The Lie Module," Conference on Cohomology of Finite Groups- Interactions and Applications, March 2015.

- **AMS meeting,** A Burnside-type theorem for exterior powers of symmetric group characters, September 2014, Eau Claire-WI.

- **Science and Art Cabaret, Hallwalls Contemporary Arts Center,** On the Cantor set: when 1-1 ≠ 0," Buffalo, NY, April 2013.

- **AMS/MAA National Meeting**, "A combinatorial approach to Specht module cohomology," San Francisco, January 2010.
- **AMS meeting,** "Generic cohomology for Young modules of the symmetric group," Kalamazoo, MI. Special session on computation in modular representation theory and cohomology.

- **AMS/MAA National Meeting**, "Cohomology of Specht modules," New Orleans, January 2007.

- **AMS meeting,** "A row removal theorem for the Ext^1 quiver of symmetric groups and Schur algebras," Chapel Hill, NC. Special session on group cohomology and algebra and geometry. October 2003.
- **AMS meeting**, "Cohomology for symmetric groups," Madison, WI. Special session on Lie theory, October 2002
- **AMS/MAA National Meeting**, "The Ext^1 quiver for completely splittable representations for symmetric groups," New Orleans, Special session on representation theory of finite and algebraic groups, January 2001

Other Talks:

- **University at Buffalo,** math club, November 2014.
- **Canisius College,** math club, February 2010.
- **University at Buffalo,** math club, January 2010.
- **University at Buffalo, SUNY** algebra seminar. Multiple talks fall 2009.
- **Harvey Mudd College,** Applied representation theory seminar, May 2007.
- **University at Buffalo, SUNY,** Colloquium February 2007.
- **University of Denver,** Colloquium February 2007.
- **University of Georgia,** Algebra Seminar, November 2005
- **University of Georgia,** Algebra Seminar, March 2005
- **University of Georgia**, Algebra Seminar, August 2004.
- **University of Oregon,** "Groups and Representation" conference in honor of Gary Seitz, March 2004.
- **University of Northern Illinois,** Colloquium, April 2004
- **Ohio State University,** Algebra seminar, February 2004
- **University of Georgia,** Algebra seminar, January 2004
- **University of Bristol,** Colloquium, May 2003
- **University of Leicester,** Pure maths seminar, May 2003
- **Oxford University,** Representation theory seminar, May 2003.
- **Oxford University,** Algebra Seminar, May 2003.
- **University of Georgia,** Undergraduate math club, April 2003.
- **University of Florida,** Conference in honor of John G. Thompson, March 2003.
- **AMS-IMS-Siam Summer Research Conference**, Groups, Representations and Cohomology, June 2002.
- **University of Georgia**, Group cohomology and representation theory seminar, 2002
- **Depaul University,** Midwest algebra and representation theory conference, December 2001
- **University of Chicago,** Group theory seminar, February 2001

PROFESSIONAL SERVICE

- **AMS Simons Travel Grant Committee 2013-2016:** Reviewed Simons travel grants.

- **Blavatnik Awards for Young Scientists: 2012-Present.** Serves as reviewer and on panel for New York Academy of Sciences.

- **Math Reviews:** Major database for published mathematics papers. I have had published 31 reviews since 2001.

- **NSF Panels:** I participated in NSF Grant or Fellowship review panels in 2010 and 2011, 2012, 2013, 2014

- **NSA Grant Review:** I reviewed grants for the NSA in 2010, 2012, 2014.

- **Referee:** In recent years I have refereed journal submissions or book proposals for:

Advances in Mathematics
Algebras and Representation Theory
Algebra Colloq.
Bulletin of the Institute of Mathematics Academia Sinica
Cambridge University Press
Communications in Algebra
Journal of Algebra
Journal of Algebraic Combinatorics
Journal of Combinatorial Theory
Journal of Group Theory
Journal of Pure and Applied Algebra
Pacific Journal of Mathematics
Proceedings of the London Mathematical Society
Proceedings of the American Mathematical Society
Transactions of the American Mathematical Society
Quarterly Journal of Mathematics, Oxford.

- **Memberships:** American Mathematical Society, Mathematical Association of America.

- **VIGRE group leader:** I directed a research seminar for undergraduates, graduate students and faculty on the Alperin weight conjecture for symmetric groups as part of the University of Georgia's VIGRE program. This program was funded by an NSF grant of more than $3 million.

- **Conference Organizer:** C. Pillen and I organized a special session at the annual AMS meeting in Atlanta in January 2005. These sessions are competitively chosen.

- **Conference Organizer:** E. Wiesner and I organized a special session at the AMS meeting in Syracuse, October 2010.

- **Conference Organizer:** S. Danz and I organized an Oberwolfach workshop in April of 2011. These workshops are competitively chosen.

- **Conference Organizer:** Yiqiang Li and I organized a special session at the AMS meeting in Rochester in September 2012.

UNIVERSITY SERVICE

Committee Service:

2016-Present	**Goldwater Scholarship Selection Committee**
2011-Present	**Honors College Research and Creative Activities Scholarship Panel:** Awards grants twice per year for student research projects. Students prepare a "grant proposal" under faculty guidance
2014	**Music Theory Faculty Hiring Committee**

DEPARTMENTAL SERVICE

Committee Service:

2008-Present	**Executive Committee (elected)**: Handles departmental hiring, leave requests, evaluation and renewal of junior faculty. Is the department voting body of record on tenure and promotion cases. Is responsible for most important departmental policy decisions.
2008-2017	**Algebra Exam Committee (Chair: 2011)**: Coordinate preparation and grading of PhD qualifying exam in algebra given twice yearly.
2011-2012	**Workload Committee (elected):** Evaluates faculty CV's and other material to make recommendations to the chair regarding faculty teaching loads.
2011-2012	**Committee on Departmental Hiring and Development:** Charged to develop a written 5-10 year hiring plan for the department and to provide the basis for a new departmental 5-year plan.
2009-2012	**Director of Undergraduate Studies**: Advises all mathematics majors (roughly 100 degrees/year conferred). Evaluates more than 400 transfer course articulations each year. Maintains and updates departmental catalog entries. Coordinates undergraduate scholarships and awards.
2009-2012	**Chair: Undergraduate Studies Committee:** ex-officio job for the Director of Undergraduate Studies.
2007-2011	**Colloquium Committee**
2009-2010	**Tenure Advocate:** Advocate for tenure and promotion case of Dr. Manning.
2010-2011	**Ad-hoc Departmental Workload Policy Committee:** Tasked with evaluating the current departmental workload policy and suggesting a replacement if appropriate. The workload policy was replaced with a new, more flexible policy that is being phased in beginning with the 2011-12 academic year.
2009-2011	**Ad-hoc Website Committee:** Helped design and coordinate (with the A&S web designers) the new mathematics department website, which went live in August 2011.
2009-2010	**Tenure Advocate:** Advocate for tenure and promotion case of Dr. Badzioch.
2008	**Ad-hoc Committee** on tenure case for H. June Zhu.
2008	**Ad-hoc Committee on the Chair:** Committee is formed each time a chair is to be appointed or reappointed, having various functions including determining the department's preferences, soliciting potential candidates, etc.