

Dr. Markus Schmidmeier  
Mathematical Sciences  
Florida Atlantic University  
Phone: 561-459-1975  
E-mail: markus@math.fau.edu  
Web: <https://math.fau.edu/markus>

## Curriculum Vitae

### Positions held:

- current position: Professor, Florida Atlantic University, since 2013.
- Associate Professor, Florida Atlantic University, 2007-2013.
- Visiting Professor, Norwegian University of Science and Technology (NTNU), Trondheim, Norway, Fall 2005.
- Assistant Professor, Florida Atlantic University, 2001-2007.

### Postdoctoral Experience:

- Postdoctoral Fellow/ Visiting Professor at Florida Atlantic University, 1999–2001.
- Postdoctoral Fellow at the University of Antwerp (UIA), Belgium, 8/1998–7/1999,
- Scientific Assistant, Charles University, Prague, Czech Republic, 1996–1998.

### Professional Preparation:

- Doctoral studies at Munich University (LMU), 1991-1996, “*Auslander-Reiten-Köcher für artinsche Ringe mit Polynomidentität*,”
- Diploma in mathematics at Munich University (LMU), 1983-1987 and 1988-1991,
- M.Sc. studies at Warwick University, England, 1987-1988,

### Recent meetings organized:

- *AMS Special Session on Representations of Algebras and Related Combinatorics*, at the University of Virginia in Charlottesville, VA, March 11-13, 2022, with Khrystyna Serhiyenko (University of Kentucky).
- *Recent Progress in Euclidean Geometry*, at Florida Atlantic University, March 16, 2018, on the occasion of the 65th birthday of Professor Paul Yiu, with Yuan Wang (FAU).
- *AMS Special Session on Linear Operators in Representation Theory and in Applications*, at Texas Tech University in Lubbock, TX, April 11-13, 2014, with Gordana Todorov (Northeastern University).
- *Symposion on Enumerative Combinatorics*, at Florida Atlantic University, April 4, 2014, on the occasion of the retirement of Dr. Heinrich Niederhausen.

### Doctoral Students:

- **Audrey Moore**, “*Auslander-Reiten theory for systems of submodule embeddings*”, 2006–09, first position after her Ph.D.: Assistant Professor (Mathematics) at Delaware State University.
- **David Snyder**, since 2021.

### Awards:

- TIAA-CREF Faculty Service Award for outreach to high schools (MA $\Theta$ ), April 2005.

- Bolzano Prize (Prague) for research in representation theory, January 1999.

### External Funding:

- Fulbright Foundation, *U.S. Scholar Program*, Support during sabbatical leave (Toruń, Poland, October 2022-January 2023) (application submitted)
- Simons Foundation, *Travel and Collaboration Grant*, (2012-18).
- NSF, *Dissertation Enhancement Grant*, October–December 2008, (3 months travel support for my doctoral student).

### Outreach to High Schools:

- I coordinated nine regional MA $\Theta$  competitions for high school students on January 25, 2020; January 19, 2019; January 20, 2018; January 21, 2017; March 12, 2016; March 7, 2015; January 18, 2014; January 13, 2007; and on January 7, 2006. At each event, around 900 - 1500 students compete in 13 individual, team, and school contests. This is a joint project with colleagues from Florida Atlantic University and the American Heritage High School in Plantation.

South Florida teams are amazing, many schools are among the best at MA $\Theta$  State and National Conventions!

- Organizing the dispute center at regional MA $\Theta$  high school mathematics competitions. Since 2002 I attend about one or two daylong events per year.
- Testwriter for the Matrices & Vectors exam at two MA $\Theta$  State and National Conventions, since 2018.

### Recent Invitations:

- Visitor, Toruń University, two weeks in May 2019, one week in May 2016.
- Guest Professor at the Collaborative Research Center 701 at Bielefeld University, May–June 2016.
- Guest Professor at Toruń University, Poland, May–June 2015.
- Research in Pairs, Oberwolfach, Germany, with Dr. Justyna Kosakowska, May 5–18, 2013.
- Visiting Researcher at the University of California in Santa Barbara, April-June 2009.

### Recent Visitors:

- Justyna Kosakowska (Toruń, Poland), February 1–14, 2019.
- Xiuhua Luo (Nantong University, China), Postdoctoral Fellow during AY 2017–18.
- Helene Tyler (Manhattan College), July 19–23, 2016, June 10–12, 2018, July 1–6, 2019.
- Hagen Meltzer (Szczecin, Poland), August 20–29, 2016.
- Daiva Pucinskaite (University of Kiel, Germany), Visiting Assistant Professor at FAU 2014–2017.
- Anne Henke (Oxford University), one week during August 2014.

### Publications and Preprints:

33. with J. Kosakowska, *The socle tableau as a dual version of the Littlewood-Richardson tableau*, (2020), 25 pp., to appear in the Journal of the LMS, <https://arxiv.org/pdf/2007.12221>

32. with J. Kosakowska, *Finite direct sums of cyclic embeddings*, Advances in representation theory of algebras, 159–169, Contemp. Math., **761**, Amer. Math. Soc., Providence, RI, (2021) <https://arxiv.org/abs/1905.05688>
31. with J. Kosakowska and H. R. Thomas, *Two Partial Orders for Littlewood-Richardson Tableaux*, The Electronic Journal of Combinatorics **26** (2019) #P3.20, 1–18, <https://arxiv.org/abs/1503.08942>, <https://www.combinatorics.org/ojs/index.php/eljc/article/view/v26i3p20/7880>
30. *From Schritte and Wechsel to Coxeter groups*, In: Mathematics and Computation in Music. MCM 2019. Lecture Notes in Computer Science, **11502** (2019), 113–124, Springer <https://arxiv.org/abs/1901.05106>, [https://doi.org/10.1007/978-3-030-21392-3\\_9](https://doi.org/10.1007/978-3-030-21392-3_9)
29. *2:3:4-Harmony within the Tritave*, Journal of Mathematics and Music (2019), 1–23, <https://arxiv.org/abs/1709.00375>, <https://doi.org/10.1080/17459737.2019.1605626>
28. with P. Dowbor and H. Meltzer, *The “0,1-property” for exceptional objects for nilpotent operators of degree 6 with one invariant subspace*, J. Pure Appl. Alg. **223** (2019), 3150–3203 <https://doi.org/10.1016/j.jpaa.2018.10.013>
27. with J. Kosakowska, *The Boundary of the Irreducible Components for Invariant Subspace Varieties*, Math. Zeitschrift **290**, 953–972 (2018), <https://arxiv.org/abs/1409.0174>, <https://doi.org/10.1007/s00209-018-2047-8>
26. with M. Kaniecki and J. Kosakowska, *Operations on arc diagrams and degenerations for invariant subspaces of linear operators. Part II*, Communications in Algebra **46**, 2243–2263 (2018) <https://dx.doi.org/10.1080/00927872.2017.1376212>, <https://arxiv.org/abs/1609.09042>
25. with J. Kosakowska, *Box moves on Littlewood-Richardson tableaux and an application to invariant subspace varieties*, dedicated to Fred Richman, J. Algebra **491**, 241–264 (2017), <https://arxiv.org/abs/1607.05640>, <https://dx.doi.org/10.1016/j.jalgebra.2017.07.025>
24. with A. Moore, *A Swiss Cheese Theorem for Linear Operators with Two Invariant Subspaces*, Proc. Amer. Math. Soc. **143**, 5097–5111 (2015), <https://arxiv.org/abs/1409.5772>
23. with J. Kosakowska, *Operations on Arc Diagrams and Degenerations for Invariant Subspaces of Linear Operators*; dedicated to Professor Daniel Simson, Trans. Amer. Math. Soc. **367**, 5475–5505 (2015), <https://arxiv.org/abs/1202.2813>, <https://www.ams.org/journals/tran/2015-367-08/S0002-9947-2014-06206-5/>
22. with J. Kosakowska, *Arc Diagram Varieties*; 24pp, Contemporary Mathematics “Expository Lectures on Representation Theory”, **607**, 205–224 (2014) <https://arxiv.org/abs/1211.5798>

21. with H. Tyler, *The Auslander-Reiten Components in the Rhombic Picture*; dedicated to Mark Kleiner on the occasion of his 65th birthday, *Comm. Algebra* **42** (2014), no. 3, 1312–1336. <https://arxiv.org/abs/1204.1654>
20. *Hall polynomials via automorphisms of short exact sequences*, dedicated to Professor Wolfgang Zimmermann, *Algebras and Representation Theory* **15** (2012), 449–481. <https://doi-org.ezproxy.fau.edu/10.1007/s10468-010-9250-6>
19. *The entries in the LR-tableau*, *Mathematische Zeitschrift* **268** (2012), 211–222. <https://doi-org.ezproxy.fau.edu/10.1007/s00209-010-0667-8>
18. with C. Petrero, *Abelian groups with a  $p^2$ -bounded subgroup, revisited*, *J. Alg. Applic.* **10** (2011), 377–389. <https://www.worldscinet.com/jaa/10/1003/S0219498811004823.html>
17. with G. Marks, *Extensions of simple modules and the converse of Schur’s Lemma*, in: *Advances in Ring Theory, Trends in Mathematics*, 229–237, Birkhäuser Verlag, 2010. [https://doi-org.ezproxy.fau.edu/10.1007/978-3-0346-0286-0\\_15](https://doi-org.ezproxy.fau.edu/10.1007/978-3-0346-0286-0_15)
16. with H.-D. Gronau, “*Orthogonal covers by multiplication graphs*”, *Discrete Appl. Math.* **157** (2009), 2048–2056, <https://doi-org.ezproxy.fau.edu/10.1016/j.dam.2008.08.004>
15. “*Systems of submodules and an isomorphism problem for Auslander-Reiten quivers*”, *Bull. Belg. Math. Soc. Simon Stevin* **15** (2008), 523–546. <https://doi-org.ezproxy.fau.edu/10.36045/bbms/1222783098>
14. with C. M. Ringel, “*Invariant subspaces of nilpotent linear operators. I*”, *Journal für die reine und angewandte Mathematik* **614** (2008), 1–52. <https://dx.doi.org/10.1515/CRELLE.2008.001>
13. with C. M. Ringel, “*The Auslander-Reiten Translation in Submodule Categories*”, dedicated to Idun Reiten, *Transactions of the AMS* **360** (2008), 691–716. <https://dx.doi.org/10.1090/S0002-9947-07-04183-9>
12. with C. M. Ringel, “*Submodule categories of wild representation type*”, *Journal of Pure and Applied Algebra* **205** (2006), 412–422. <https://authors.elsevier.com/sd/article/S002240490500157X>
11. “*Bounded Submodules of Modules*”, dedicated to Claus Michael Ringel on the occasion of his 60th birthday, *Journal of Pure and Applied Algebra* **203** (2005), 45–82. <https://dx.doi.org/10.1016/j.jpaa.2005.02.003>
10. “*A Construction of Metabelian Groups*”, *Archiv der Mathematik* **84** (2005), 392–397. <https://dx.doi.org/10.1007/s00013-005-1243-z>
9. *A family of noetherian rings with their finite length modules under control*, dedicated to Helmut Lenzing on the occasion of his 60th birthday, *Czechoslovak Journal of Mathematics* **52** (3), (2002), 545–552. <https://dx.doi.org/10.1023/A:1021723728841>
8. *Ring units in iterated cyclic extensions, and in NTRU*, *Tatra Mountains Math. Pub.* **25** (2002), 127–136.

7. *When are artinian PI-rings artin algebras?*, Communications in Algebra **29**, (2001), 1659-1668.  
<https://dx.doi.org/10.1081/AGB-100002125>
6. *The finite length modules for thin  $\mathbb{Z}$ -graded rings*, Communications in Algebra **29** (3) (2001), 1041–1067.  
<https://dx.doi.org/10.1081/AGB-100001666>
5. *Endofinite modules over hereditary artinian PI-rings*, Canadian Mathematical Society Conference Proceedings Vol. **24** (1998), 497–511.
4. *The local duality for homomorphisms and an application to pure semisimple PI-rings*, Colloquium Mathematicum **77**, (1998), 121–132.
3. *Auslander-Reiten theory for artinian PI-rings*, Journal of Algebra **77** (1998), 72-81.  
<http://dx.doi.org/10.1006/jabr.1998.7448>
2. *A dichotomy for finite length modules induced by the local duality*, Communications in Algebra **25**(6), (1997), 1933-1944.  
<https://dx.doi.org/10.1080/00927879708825964>
1. *Auslander-Reiten-Köcher für artinsche Ringe mit Polynomidentität*, Dissertation, Ludwig-Maximilians-Universität München, 1996.

#### Some Recent Conference Talks:

- US-Mexico Conference on Non-commutative Algebra and Representation Theory, **Mexico City**, *Crossing and Noncrossing Partitions of the Disk*, January 15-17, 2015.
- Algebra meets Algebraic Combinatorics, **Kingston, Ontario**, *The entries in the Littlewood-Richardson tableau*, January 23–25, 2015.
- Maurice Auslander International Conference, **Woods Hole, MA**, *Crossing and non-crossing partitions of the disk*, April 29–May 4, 2015.
- Lectures in **Toruń, Poland**: *I. Auslander-Reiten sequences and coverings. II. Invariant subspaces of nilpotent linear operators via rank functions. III. On gaps and holes: Which dimension types can be realized? IV. An application to linear time-invariant dynamical systems.* May 14–21, 2015.
- Colloquium at Charles University, **Prague**, *A Swiss Cheese Theorem for invariant subspaces of nilpotent linear operators*, June 2, 2015.
- Advances in Representation Theory of Algebras (ARTA IV), *Two partial orders for Littlewood-Richardson tableaux*, **Guanajuato, Mexico**, June 22–26, 2015.
- XXVIIth Meeting on Representations of Algebras, Bishop’s University, **Sherbrooke, Quebec**, *Extensions of Abelian groups with a cyclic subgroup*, September 4–5, 2015.
- Colloquium at NTNU, **Trondheim**, Norway, *A Swiss Cheese Theorem for invariant subspaces of nilpotent linear operators*, September 23, 2015.
- Colloquium at **Uppsala** University, Sweden, *A Swiss Cheese Theorem for invariant subspaces of nilpotent linear operators*, October 6, 2015.
- **London, Ontario**: Combinatorial Algebra meets Algebraic Combinatorics, *Partial maps on Littlewood-Richardson tableaux*, January 22–24, 2016.
- **Mar del Plata, Argentina**: ARTA V, *Direct sums of cyclic embeddings*, March 14–18, 2016.

- Colloquium at the National University of Patagonia — San Juan Bosco, **Puerto Madryn, Argentina**, *A Swiss Cheese Theorem for invariant subspaces of nilpotent linear operators*, March 22, 2016.
- Maurice Auslander International Conference, **Woods Hole, MA**, April 27–May 2, 2016.
- Colloquium at **Toruń** University: *Finite direct sums of cyclic embeddings with an application to invariant subspace varieties*, May 18, 2016.
- Colloquium at **Bielefeld** University: *Finite direct sums of cyclic embeddings with an application to invariant subspace varieties*, June 3, 2016.
- Colloquium at the University of **Verona, Italy**: *Hammocks via the defect of a short exact sequence*, July 6, 2016.
- ICRA Conference, **Syracuse, NY**, *Hammocks via the defect of a short exact sequence*, August 15–19, 2016.
- 2nd International Colloquium on Representations of Algebras and Its Applications; Alexander Zavadskij, **Bogota, Colombia**, *Hammocks in the representation theory of posets*, October 10–12, 2016.
- AMS Special Session on Representations of Algebras, **Boston** Northeastern, *The boundary of irreducible components: T. Maeda's example*, April 21–22, 2018.
- Auslander Conference, **Woods Hole, MA**, April 25–30, 2018.
- International Conference on Representations of Algebras (ICRA 2018), *A reflection equivalence for Gorenstein-projective quiver representations*, **Prague, Czech Republic**, August 13–17, 2018.
- ARTA VII, **Mexico City**, September 24–28, 2018.
- MAA-Florida meeting, **Lakeland, FL**, February 15–16, 2019, *2:3:4 Harmony within the Tritave*.
- Auslander Conference, **Woods Hole, MA**, April 24–29, 2019, 10-minute talk: *Gorenstein projective  $\mathbb{Z}[\varepsilon]$ -modules*.
- Colloquium Nicolaus Copernicus University **Toruń, Poland**, May 21, 2019, *Visualizing harmony using reflection groups*.
- Colloquium Karl-Franzens-Universität **Graz, Austria**, June 3 or 4, 2019, *Ext as a  $k[T]$ -module*.
- Mathematics and Computation in Music MCM 2019, **Madrid, Spain**, June 18–21, *From Schritte and Wechsel to Coxeter Groups.*
- Homological Methods and Tilting Theory, **Iowa City, Iowa**, August 16–19, 2019.
- Representation theory in Bielefeld - past and future, **Bielefeld, Germany**, September 24–26, 2019, *Linear operators in representation theory and in applications*.
- MA $\Theta$  Region 5 High School Math Competition, **Davie, Florida**, January 25, 2020, *Prime Numbers in Harmony*.
- Representation theory of algebras - Corona Edition, **Sherbrooke, Quebec**, September 25–26, 2020, *Tableau invariants to position objects in the Auslander-Reiten quiver and in representation space*.
- International conference on representations of algebras – Alexander Zavadskij, **Bogota, Colombia** (online), November 21–23, 2020, Final Talk: *Tableau invariants to position objects in the Auslander-Reiten quiver and in representation space*.
- Homological Methods in Representation Theory, **Frauenchiemsee, Germany** (in person), October 4–8, 2021.