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## Curriculum Vitae

### Positions held:

- current position: Professor, Florida Atlantic University, since 2013.
- Guest Professor, Toruń University, Poland, May-June 2015.
- 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, advisor: Professor Fred Van Oystaeyen, Ph.D.
- 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*,” advisor: Prof. Dr. Wolfgang Zimmermann.
- Diploma in mathematics at Munich University (LMU), 1983-1987 and 1988-1991, advisor: Prof. Dr. Wolfgang Zimmermann.
- M.Sc. studies at Warwick University, England, 1987-1988, Advisor: Dr. Charu Harjanavis.

### Seminars and Meetings organized:

- *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).
- *Symposium on Enumerative Combinatorics*, at Florida Atlantic University, April 4, 2014, on the occasion of the retirement of Dr. Heinrich Niederhausen.
- *AMS Special Session on Representations of finite dimensional algebras*, November 2009, with Frauke Bleher (University of Iowa) and Birge Huisgen-Zimmermann (UCSB).

- *Conference on Abelian Groups and on Constructive Mathematics*, in honor of the 70th birthdays of Ray Mines (NMSU) and Fred Richman (FAU), May 2008, with Lee Klingler (FAU), Bruce Olberding (NMSU), and Peter Schuster (LMU, Munich).
- *Southeastern Algebra Conference*, November 2003, with Lee Klingler (FAU). Participants of the conference could obtain travel support through the NSF.

### Students:

- Doctoral student: **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.
- Masters students: **Myriam T. Anez**, “*Computation of Hall coefficients*”, December 2005, and **Carla Petrero**, “*Subgroups of bounded abelian groups*”, May 2004.
- Recent projects: **Hasala Gallolu**, “*Invariant subspaces in optimal control theory*”, M.S. Presentation, July 2012; **Pam Patch**, “*Mathematics of the tonal systems*”, B.S. Honors Thesis, May 2012; **Xhavid Muqaj**, “*Cyclic modules generated by analytic functions*”, M.S. Presentation, April 2012; **Duval Zephirin**, “*Relabeling the Platonic solids: An application of the Unique Factorization Theorem*”, M.S. Presentation, March 2012.

### 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:

- Simons Foundation, *Travel and Collaboration Grant*, (2012-18).
- *Collaborative Research Center 701 at Bielefeld University*: May – June 2016 (5 weeks), December 2010–January 2011 (1 month), December 2009–January 2010 (1 month), October–December 2008 (3 months).
- NSF, *Dissertation Enhancement Grant*, October–December 2008, (3 months travel support for my doctoral student).

### Outreach to High Schools:

- I coordinated eight regional MA $\Theta$  competitions for high school students on 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.

- 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 the 2019 MA $\Theta$  State Convention.

#### Recent Invitations:

- Guest Professor at the Collaborative Research Center 701 at Bielefeld University, May–June 2016.
- Visitor, Toruń University, one week in May 2016.
- Guest Professor at Toruń University, Poland, May–June 2015.
- Research in Pairs, Oberwolfach, Germany, with Dr. Justyna Kosakowska, May 5–18, 2013.
- Visitor, Toruń University, Poland, December 2011 and June 2013.
- Visiting Researcher at the University of California in Santa Barbara, April–June 2009.
- Visiting Researcher at Cologne University, January–March 2009 and July–August 2009.
- Guest Professor at the Collaborative Research Center 701 at Bielefeld University, October–December 2008, December 2009, December 2010.

#### 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 and June 10–12, 2018.
- 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.
- Justyna Kosakowska (Toruń, Poland), April 6–27, 2014 and March 1–15, 2011.
- Hans-Dietrich Gronau (Universität Rostock), February 23 – March 10, 2012, and March 2–26, 2013.
- Mark Kleiner (Syracuse U, NY), November 7 – December 7, 2011,
- Gordana Todorov (Northeastern University), May 8–11, 2011,
- Bernhard Keller (Université Paris Diderot - Paris 7), January 20, 2010.

#### Publications and Preprints:

33. *From Schritee and Wechsel to Coxeter groups*, manuscript, 6pp. (2018)
32. *2:3:4-Harmony within the Tritave*, manuscript (2017), 34pp., <http://arxiv.org/abs/1709.00375>
31. with J. Kosakowska and H. R. Thomas, *Two Partial Orders for Littlewood-Richardson Tableaux*, manuscript, 18 pp. (2015), <http://arxiv.org/abs/1503.08942>
30. with P. Dowbor and H. Meltzer, *The “0,1-property” for exceptional objects for nilpotent operators of degree 6 with one invariant subspace*, to appear in *J. Pure Appl. Alg.*, 61pp. (2018)
29. 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) <http://dx.doi.org/10.1080/00927872.2017.1376212> <http://arxiv.org/abs/1609.09042>
28. with J. Kosakowska, *The Boundary of the Irreducible Components for Invariant Subspace Varieties*, *Math. Zeitschrift* **290**, 953–972 (2018) <http://arxiv.org/abs/1409.0174>
27. 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) <http://arxiv.org/abs/1607.05640>
26. with A. Moore, *A Swiss Cheese Theorem for Linear Operators with Two Invariant Subspaces*, *Proc. Amer. Math. Soc.* **143**, 5097–5111 (2015), <http://arxiv.org/abs/1409.5772>
25. with J. Kosakowska, *Varieties of Invariant Subspaces Given by Littlewood-Richardson Tableaux*; 33 pp. (2014), Oberwolfach Preprint 2014-01 <http://math.fau.edu/markus/ks-mfo-preprint.pdf>
24. with J. Kosakowska, *Arc Diagram Varieties*; 24pp, *Contemporary Mathematics “Expository Lectures on Representation Theory”*, **607**, 205–224 (2014) <http://arxiv.org/abs/1211.5798>
23. 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. <http://arxiv.org/abs/1204.1654>
22. 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), <http://arxiv.org/abs/1202.2813>

21. *Hall polynomials via automorphisms of short exact sequences*, dedicated to Professor Wolfgang Zimmermann, *Algebras and Representation Theory* **15** (2012), 449–481.  
<http://www.springerlink.com/content/y615135307588r75/>
20. *The entries in the LR-tableau*, *Mathematische Zeitschrift* **268** (2012), 211–222.  
<http://www.springerlink.com/content/5213un01j674j1n4/>
19. 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.  
<http://www.springerlink.com/content/k7770ur534411618/>
18. with H.-D. Gronau, “*Orthogonal covers by multiplication graphs*”, *Discrete Appl. Math.* **157** (2009), 2048-2056,  
<http://www.sciencedirect.com/science/article/pii/S0166218X0800334X>
17. “*Systems of submodules and an isomorphism problem for Auslander-Reiten quivers,*”, *Bull. Belg. Math. Soc. Simon Stevin* **15** (2008), 523-546.  
<http://projecteuclid.org/getRecord?id=euclid.bbms/1222783098>
16. with C. Petroro, *Abelian groups with a  $p^2$ -bounded subgroup, revisited*, *J. Alg. Applic.* **10** (2011), 377-389.  
<http://www.worldscinet.com/jaa/10/1003/S0219498811004823.html>
15. with C. M. Ringel, “*Invariant subspaces of nilpotent linear operators. I*”, *Journal für die reine und angewandte Mathematik* **614** (2008), 1-52.  
<http://dx.doi.org/10.1515/CRELLE.2008.001>
14. with C. M. Ringel, “*The Auslander-Reiten Translation in Submodule Categories*”, dedicated to Idun Reiten, *Transactions of the AMS* **360** (2008), 691-716.  
<http://dx.doi.org/10.1090/S0002-9947-07-04183-9>
13. with C. M. Ringel, “*Submodule categories of wild representation type*”, *Journal of Pure and Applied Algebra* **205** (2006), 412-422.  
<http://authors.elsevier.com/sd/article/S002240490500157X>
12. “*A Remark by M.C.R. Butler on Subgroup Embeddings,*” *Oberwolfach Report* **6** (2005), 9063-9066.
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.  
<http://dx.doi.org/10.1016/j.jpaa.2005.02.003>
10. “*A Construction of Metabelian Groups*”, *Archiv der Mathematik* **84** (2005), 392-397.  
<http://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.  
<http://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.  
<http://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.  
<http://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.  
<http://dx.doi.org/10.1080/00927879708825964>
1. *Auslander-Reiten-Köcher für artinsche Ringe mit Polynomidentität*, (“Auslander-Reiten quivers for artinian polynomial identity rings”), Doctoral dissertation, Ludwig-Maximilians Universität München, 1996.

#### Some Recent Conference Talks:

- International Conference on the Representation Theory of Algebras **ICRA VIII, Trondheim and Geiranger**, August 1996, 50 minute plenary talk: *Black and White Modules over Artinian PI-Rings*.
- **Oberwolfach** Conference on Ring Theory (Michler/Small), Germany, August 1997; *An Upper Bound for the Endlength of the Transpose of a Finite Length Module*.
- Seminar Alev-Keller-Levasseur-Malliavin, **Paris**, March 1998, *Kronecker’s Problem for Semilinear Maps*.
- International Conference on Representations of Algebras **ICRA X, Toronto**, Canada, July 22–31, 2002, 50 minute plenary talk: *Subgroups of finite abelian groups*.

- 11<sup>th</sup> International Conference on Representations of Algebras (**ICRA XI**), **Patzcuaro**, Mexico, August 16–20, 2004, 25 minute plenary talk: *The Second Minimal Family of Subgroup Embeddings*.
- BIRS Workshop: Interaction of Finite Dimensional Algebras with other areas of Mathematics, September 25–30, 2004, **Banff**, Alberta, Canada.
- Oberwolfach Meeting: Representation Theory of Finite-Dimensional Algebras, February 6–12, 2005, **Oberwolfach**, Germany, *A remark by M.C.R. Butler on subgroup embeddings*.
- Sophus Lie Seminar at **Tromsø** University, Norway, December 1, 2005, 2 hour presentation on *Nilpotent Linear Operators*.
- The ADE chain workshop, **Bielefeld**, October 31 – November 1, 2008, *Half the ADE chain, at twice the speed*. Final talk.
- International Workshop on Operator Theory and its Applications (IWOTA 2010), **TU Berlin**, July 7–12, 2010, with travel support through the NSF, *Linear operators with two invariant subspaces: The Swiss Cheese Theorem and an application to control theory*.
- Test problems in representation theory, **Banff** workshop September 12–17, 2010, *What is known about... Invariant subspaces of nilpotent linear operators? A survey. II*, and: *Three Slides*.
- Auslander Conference, **Woods Hole**, Massachusetts, April 14–19, 2011, *Gabriel-Roiter families occurring in tubes*.
- **Shanghai** Conference on Representations of Algebras, October 3–7, 2011, Invited talk (50 minutes), *Operations on arc diagrams and a degeneration result for linear operators*.
- Workshop on representations of algebras, non-commutative geometry and singularity theory, **Banff** International Research Station, May 6–11, 2012, *Operations on arc diagrams and degenerations for invariant subspaces*.
- 31st Ohio State-Denison Mathematics Conference, **Columbus, Ohio**, *Operations on arc diagrams and degenerations for invariant subspaces of linear operators*, May 25–27, 2012.
- Workshop and International Conference on Representations of Algebras (ICRA 2012), **Bielefeld, Germany**, August 8 – 17, 2012, *ADE Posets*.
- Conference on Geometric Methods in Representation Theory, **Columbia, MO**, plenary talk, *Arc diagram varieties*, November 17–19, 2012.
- Advances in Representation Theory of Algebras (ARTA I), **Guajuato, México**, *Arc diagram varieties, Part I*, 30 minute presentation, December 3–7, 2012
- Advances in Representation Theory of Algebras (ARTA II), **Toruń, Poland**, *Varieties of linear operators given by Littlewood-Richardson tableaux*, 50 minute presentation, September 9–13, 2013.

- Canadian Mathematical Society Winter Meeting, **Ottawa, Ontario**, *Box moves on Littlewood-Richardson tableaux*, December 7–9, 2013.
- 32nd Ohio State-Denison Mathematics Conference, **Columbus, Ohio**, *Posets of increasing complexity*, May 9 – 11, 2014.
- Advances in Representation Theory of Algebras (ARTA III), **Montreal, Quebec**, *No gaps but holes*, June 16–20, 2014.
- Geometric Methods in Representation Theory, **Iowa City**, November 22–24, 2014.
- 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 noncrossing 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.