Harm Derksen

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Education

University of Basel — Basel, Switzerland
Ph.D. in Mathematics, Summa Cum Laude, Advisor: Hanspeter Kraft — 1993–1997
- Thesis: "Constructive Invariant Theory and the Linearization Problem"

Radboud University — Nijmegen, the Netherlands
M.Sc. in Mathematics, Cum Laude, Advisor: Arno van den Essen — 1988–1993
- Thesis: "Locally Finite Derivations and Algebraic Group Actions"

Experience

Northeastern University — Boston, MA
College of Science Distinguished Professor — 2025–present

Northeastern University — Boston, MA
Full Professor — 2020–2025

University of Michigan — Ann Arbor, MI
Full Professor in Mathematics — 2009–2020

University of Michigan — Ann Arbor, MI
Associate Professor in Mathematics — 2004–2009

University of Michigan — Ann Arbor, MI
Assistant Professorin Mathematics — 2000–2004

Massachusetts Institute of Technology — Cambridge, MA
C.L.E. Moore Instructor in Mathematics — 1998–2000

Northeastern University — Boston, MA
Research Scholar in Mathematics — 1997–1998

Honors and Awards

- Fellow of the American Mathematical Society — 2022–present
- Study Prize for Master Thesis, University of Nijmegen, the Netherlands — 1994
- First prize, Dutch University Mathematics Competition — 1994
- Bronze Medal, International Mathematical Olympiad — 1988

Grants and Scholarships

- Simons Foundation Fellowship, $162,000 — 2025–2026
- Co-Principal Investigator, Northeastern University seed grant,$50,000, "New mathematical techniques for pseudorandomness and group products" — 2022–2023
- Principal Investigator, NSF grant DMS 2147769 (2001460), $293,000 "Invariant Theory and Complexity Theory for Quiver Representations and Tensors" — 2020–2025
- Co-Principal Investigator, NSF grant IIS 2014003, $996,386 "SCH: INT: Improving Care for Heart Failure Patients Using Tropical Geometry and Soft Computing" — 2020–2024
- Principal Investigator (2018–2020), Co-Pincipal Investigator (2020–2023), NSF grant IIS 1837985, $1,418,872 "BIG DATA: F: Algorithms for Tensor-Based Modeling of Large Scale Structured Data" — 2018–2023

- Principal Investigator, NSF grant DMS 1601229, $285,000 2016–2019
  "Invariant Theory, Tensors and Applications"
- Co-Investigator, NSF grant IIS 1722801, $1,299,371 2017–2021
  "SCH: INT: Data in Motion Prediction and Assessment of Acute Respiratory Distress Syndrome"
- Co-Investigator, Toyota Motor Company, grant, $1,573,526 2017–2020
  "Development and Assessment of an In-Vehicle Cardiac Monitoring and Severe Event Prediction System"
- Co-Investigator, Department of Defense, grant, BA150235, $2,202,042 2017–2020
  "A Multimodal Integrative Platform for Continuous Monitoring and Decision Support during Postoperative Care in Cardiac Patients"
- Principal Investigator, NSF grant, DMS 1302032, $142,865 2013–2016
  "Invariant Theory, Complexity and Quivers"
- Principal Investigator, NSF grant DMS 0901298, $379,101 2009–2013
  "Invariant Theory and Algebraic Combinatorics"
- Principal Investigator, NSF CAREER grant DMS 0349019, $400,000 2004–2009
  "Invariant Theory, Algorithms and Applications"
- Principal Investigator, NSF grant DMS 0102193, $95,494 2001–2004
  "Quivers, Invariant Theory and Applications"
- Co-Investigator, NSF grant DMS 9970165, $53,931 1999–2001
  "Reductive Group and their Invariants"
- Scholarship, Swiss National Science Foundation, Freiwillige Akademische Gesellschaft, Basel, Sfr. 34,000 1997–1999
- Scholarship, VSB Bank, the Netherlands,DFL 9,000 1994

Patents

US patent US11154254B2, K. Najarian **H. Derksen**, Z. Li, J. Gryak, P. Gunaratne
Systems and methods for predicting and detecting a cardiac event 2023

US patent US20230350973A1, pending, K. Najarian, O. Pifer Alge, J. Gryak, **H. Derksen**, C. Minoccheri
Methods and Systems for Multilinear Discriminant Analysis Via Invariant Theory for Data Classification 2023

US patent US20230394340A1, pending,
K. Najarian, J. Zhang, K. D. Aaronson, J. R. Golbus, J. Gryak, **H. Derksen**, H. Yao
Novel Tropical Geometry-Based Interpretable Machine Learning Method 2023

US patent US20220246251A1, pending, M. Bagherian, K. Najarian, **H. Derksen**
Coupled matrix-matrix and coupled tensor-matrix completion methods for predicting drug-target interaction 2022

US patent US20210338171A1, pending, H. Derksen, N. Tokcan, K. Najarian, J. Gryak
Tensor amplification-based data processing 2021

US patent US9974488B2, K. Najarian,A. Belle, K. Ward, **H. Derksen**
Early detection of hemodynamic decompensation using taut-string transformation 2018

Service

To Northeastern University:

- Chair of the Undergraduate Research Committee, 2021–present
- Faculty Search Committee, 2020, 2022, 2023
- Zelevinsky Postdoctoral Search Committee, 2021
- Tenure and Promotion Committees (for specific faculty members), 2021 (2 committees, chair of one)
- College of Science Tenure and Promotions Committee, 2022–present (Chair in 2023)

External Service:

- Editor, Indagationes Mathematicae 2025–present
- SIAG/AG Agnes Szanto Early Career Prize Committee, 2024

- Editor, Applicable Algebra in Engineering, Communication and Computing 2009–present
- Editor, Proceedings of the American Mathematical Society 2009–2016
- Editor, Journal of Algebra 2007–2014
- Member of the Questions Committee for 3rd Al-Khorezmi International Mathematical Olympiad 2025
- Member of the Questions Committee, William Lowell Putnam Competition 2015–2018
- Organizer of the Univ. of Michigan Undergraduate Math. Competition 2005–2014
- NSF panel 2002, 2006, 2014, 2018

Graduate Students

Zhi Jiang, PhD — University of Michigan
Tensors, Cap Set and Invariant Theory — 2022

Alana Huszar, PhD — University of Michigan
Non-commutative Rank, Quivers, and Tensors — 2022

Robert Cochrane, PhD — University of Michigan
Tensor Ranks and Norms — 2022

Francesca Gandini, PhD — University of Michigan
Ideals of Subspace Arrangements — 2019

Visu Makam, PhD — University of Michigan
Invariant Theory, Tensors and Computational Complexity — 2016

Harlan Kadish, PhD — University of Michigan
Complexity in Invariant Theory — 2011

Jiarui Fei, PhD — University of Michigan
General Presentations of Algebras — 2010

Ryan Kinser, PhD — University of Michigan
Rank functors and representation rings of quivers — 2009

Calin Chindris, PhD — University of Michigan
Quivers, long exact sequences and Horn type inequalities — 2005

Jessica Sidman, PhD (coadvisor) — University of Michigan
On the Castelnuovo -Mumford regularity of subspace arrangements — 2002

Supervision of Major Undergraduate Research Projects

- Angela Barrett, Northeastern University, REU, Funded by NSF, 2024
- Daniel Kiem, Northeastern University, REU, Funded by NSF, 2024
- Mitchell Wadas, Northeastern University, REU, Funded by NSF, 2024
- Zoey Yelsky, Northeastern University, Jr./Sr. Thesis, 2024
- Xuyang Li, Northeastern University, Jr./Sr. Thesis, 2022
- Tharini Padmagirisan (Master's student), Northeastern University, Funded by NSF, 2022
- E. Dean Young, University of Michigan, REU, Funded by NSF, 2018, 2019
- Moise Mouyebe, University of Michigan, REU,funded by NSF, 2016, 2017
- Neophytos Charalambides, University of Michigan 2016
- Brian Nixon, University of Michigan, REU, Funded by NSF 2008
- Mendel Feygelson, University of Michigan, REU, Funded by NSF 2007
- Theodore Owen, REU, University of Michigan, Funded by NSF, 2007
- Fernando Delgado, University of Michigan 2004
- Justin Malestein, University of Michigan, REU, Funded by NSF 2003
- Chris Battey, University of Michigan, Funded by NSF, REU 2002
- Anna Maltseva, REU, University of Michigan, Funded by NSF 2002

Postdoc Mentoring

- Alexandra (Sasha) Pevzner, Northeastern University 2024–present
- Benjamin Lovitz, Northeastern University 2022–2025
- Cristian Minocceri, University of Michigan 2018–2020
- Neriman Tokcan University of Michigan 2017–2019
- Jack Jeffries, University of Michigan 2015–2018
- Rob Eggermont (co-mentor), University of Michigan 2015–2017
- Tatyana Chmutova, University of Michigan 2007–2009
- Sophie Morier-Genoud, University of Michigan 2006–2009

Publications (books)

[1] **H. Derksen** and J. Weyman, *An introduction to quiver representations*, ser. Graduate Studies in Mathematics. American Mathematical Society, Providence, RI, 2017, vol. 184, pp. x+334.

[2] **H. Derksen** and G. Kemper, *Computational invariant theory*, enlarged, ser. Encyclopaedia of Mathematical Sciences. Springer, Heidelberg, 2015, vol. 130, pp. xxii+366, With two appendices by Vladimir L. Popov, and an addendum by Norbert A'Campo and Popov, Invariant Theory and Algebraic Transformation Groups, VIII, ISBN: 978-3-662-48420-3; 978-3-662-48422-7.

Publications (papers in peer-reviewed journals an conferences)

[1] **H. Derksen** and B. Lovitz, "Constructive counterexamples to the additivity of minimum output Rényi entropy of quantum channels for all $p > 1$", in *Quantum Information Processing Conference (QIP 2026)*, 2025.

[2] P. Alge, J. Pickard, W. Zhang, S. Cheng, **H. Derksen**, G. S. Omenn, J. Gryak, J. S. VanEpps, and K. Najarian, "Continuous sepsis trajectory prediction using tensor-reduced physiological signals", *Scientific Reports*, vol. 14, no. 1, p. 18 155, 2024.

[3] **H. Derksen**, N. Johnston, and B. Lovitz, "X-arability of mixed quantum states", in *Theory of Quantum Computation, Communication and Cryptography (TQC 2025)*, 2024.

[4] **H. Derksen**, C. H. Lee, and E. Viola, "Boosting uniformity in quasirandom groups: Fast and simple", in *2024 IEEE 65th Annual Symposium on Foundations of Computer Science (FOCS)*, IEEE, 2024, pp. 1425–1430.

[5] **H. Derksen**, V. Makam, and J. Zuiddam, "Subrank and optimal reduction of scalar multiplications to generic tensors", *Journal of the London Mathematical Society*, vol. 110, no. 2, e12963, 2024.

[6] F. Rajaei, P. Toogood, R. Jacob, M. Baber, M. Gough, **H. Derksen**, E. Wittrup, and K. Najarian, "Identifying selective pdhk inhibitors using coupled tensor matrix completion and experimental validation", *Discover Artificial Intelligence*, vol. 4, no. 1, p. 89, 2024.

[7] **H. Derksen**, I. K. V. Makam, and J. Volčič, "Ranks of linear matrix pencils separate simultaneous similarity orbits", *Advances in Mathematics*, vol. 415, p. 108 888, 2023.

[8] **H. Derksen** and V. Makam, "Invariant theory and wheeled props", *Journal of Pure and Applied Algebra*, vol. 227, no. 9, p. 107 302, 2023.

[9] **H. Derksen** and E. Viola, "Quasirandom groups enjoy interleaved mixing", *Discrete Analysis*, vol. 2023:14, 2023.

[10] P. D. McKee, **H. Derksen**, and J. A. Christian, "View invariants for three-dimensional points with constrained observer motion", *Journal of Guidance, Control, and Dynamics*, vol. 46, no. 2, pp. 277–285, 2023.

[11] C. Minoccheri, O. Alge, J. Gryak, K. Najarian, and **H. Derksen**, "Quadratic multilinear discriminant analysis for tensorial data classification", *Algorithms*, vol. 16, no. 2, p. 104, 2023.

[12] C. Chindris and **H. Derksen**, "The capacity of quiver representations and brascamp–lieb constants", *International Mathematics Research Notices*, vol. 2022, no. 24, pp. 19 399–19 430, 2022.

[13] J. A. Christian and **H. Derksen**, "Invariant theory as a tool for spacecraft navigation", in *AAS/AIAA Astrodynamics Specialist Conference, AAS Paper*, 2022, pp. 22–746.

[14] **H. Derksen**, "The g-stable rank for tensors and the cap set problem", *Algebra & Number Theory*, vol. 16, no. 5, pp. 1071–1097, 2022.

[15] **H. Derksen** and V. Makam, "Highly entangled tensors", *Linear and Multilinear Algebra*, vol. 70, no. 2, pp. 380–393, 2022.

[16] **H. Derksen** and V. Makam, "Polystability in positive characteristic and degree lower bounds for invariant rings", *Journal of Combinatorial Algebra*, vol. 6, no. 3, pp. 353–405, 2022.

[17] **H. Derksen**, V. Makam, and M. Walter, "Maximum likelihood estimation for tensor normal models via castling transforms", in *Forum of Mathematics, Sigma*, Cambridge University Press, vol. 10, 2022, e50.

[18] **H. Derksen** and E. Viola, "Fooling polynomials using invariant theory", in *2022 IEEE 63rd Annual Symposium on Foundations of Computer Science (FOCS)*, IEEE, 2022, pp. 399–406.

[19] H. Yao, **H. Derksen**, J. R. Golbus, J. Zhang, K. D. Aaronson, J. Gryak, and K. Najarian, "A novel tropical geometry-based interpretable machine learning method: Pilot application to delivery of advanced heart failure therapies", *IEEE Journal of Biomedical and Health Informatics*, vol. 27, no. 1, pp. 239–250, 2022.

[20] M. Bagherian, R. B. Kim, C. Jiang, M. A. S. **H. Derksen**, and K. Najarian, "Coupled matrix–matrix and coupled tensor–matrix completion methods for predicting drug–target interactions", *Briefings in bioinformatics*, vol. 22, no. 2, pp. 2161–2171, 2021.

[21] **H. Derksen** and V. Makam, "Maximum likelihood estimation for matrix normal models via quiver representations", *SIAM Journal on Applied Algebra and Geometry*, vol. 5, no. 2, pp. 338–365, 2021.

[22] J. A. C. **H. Derksen** and R. Watkins, "Lunar crater identification in digital images", *The Journal of the Astronautical Sciences*, vol. 68, no. 4, pp. 1056–1144, 2021.

[23] L. Hernandez, R. Kim, N. Tokcan, **H. Derksen**, B. E. Biesterveld, A. Croteau, A. M. Williams, M. Mathis, K. Najarian, and J. Gryak, "Multimodal tensor-based method for integrative and continuous patient monitoring during postoperative cardiac care", *Artificial Intelligence in Medicine*, vol. 113, p. 102 032, 2021.

[24] Z. Li, **H. Derksen**, G. J., C. Jiang, Z. Gao, W. Zhang, H. Ghanbari, P. Gunaratne, and K. Najarian, "Prediction of cardiac arrhythmia using deterministic automata", *Biomedical Signal Processing and Control*, vol. 63, p. 102 200, 2021.

[25] N. Reamaroon, M. W. Sjoding, J. Gryak, B. D. Athey, K. Najarian, and **H. Derksen**, "Automated detection of acute respiratory distress syndrome from chest x-rays using directionality measure and deep learning features", *Computers in biology and medicine*, vol. 134, p. 104 463, 2021.

[26] N. Tokcan, J. Gryak, K. Najarian, and **H. Derksen**, "Algebraic methods for tensor data", *SIAM J. Appl. Algebra Geom.*, vol. 5, no. 1, pp. 1–27, 2021.

[27] **H. Derksen** and V. Makam, "Algorithms for orbit closure separation for invariants and semi-invariants of matrices", *Algebra Number Theory*, vol. 14, no. 10, pp. 2791–2813, 2020.

[28] **H. Derksen** and V. Makam, "An exponential lower bound for the degrees of invariants of cubic forms and tensor actions", *Adv. Math.*, vol. 368, pp. 107136, 25, 2020.

[29] **H. Derksen** and V. Makam, "The regularity lemma is false over small fields", *Comm. Algebra*, vol. 48, no. 3, pp. 1333–1339, 2020.

[30] N. Reamaroon, M. W. Sjoding, **H. Derksen**, E. Sabeti, J. Gryak, R. P. Barbaro, B. D. Athey, and K. Najarian, "Robust segmentation of lung in chest x-ray: Applications in analysis of acute respiratory distress syndrome", *BMC Medical Imaging*, vol. 20, no. 1, pp. 1–13, 2020.

[31] **H. Derksen** and V. Makam, "Explicit tensors of border rank at least $2d-2$ in $K^d \otimes K^d \otimes K^d$ in arbitrary characteristic", *Linear Multilinear Algebra*, vol. 67, no. 10, pp. 2104–2116, 2019.

[32] Z. Li., **H. Derksen**, M. Mooshmand, A. Wood, H. Ghanbari, P. Gunaratne, and K. Najarian, "Markov models for detection of ventricular arrhythmia", in *41st Intern. Conf. of the IEEE EMBC*, 2019, pp. 1488–1491.

[33] E. Sabeti, J. Gryak, **H. Derksen**, C. Biwer, S. Ansari, H. Isenstein, A. Kratz, and K. Najarian, "Learning using concave and convex kernels: Applications in predicting quality of sleep and level of fatigue in fibromyalgia", *Entropy*, vol. 21, no. 5, Paper No. 442, 16, 2019.

[34] **H. Derksen**, "A general theory of singular values with applications to signal denoising", *SIAM J. Appl. Algebra Geom.*, vol. 2, no. 4, pp. 535–596, 2018.

[35] **H. Derksen**, "On the equivalence between low-rank matrix completion and tensor rank", *Linear Multilinear Algebra*, vol. 66, no. 4, pp. 645–667, 2018.

[36] **H. Derksen** and V. Makam, "Degree bounds for semi-invariant rings of quivers", *J. Pure Appl. Algebra*, vol. 222, no. 10, pp. 3282–3292, 2018.

[37] **H. Derksen** and V. Makam, "On non-commutative rank and tensor rank", *Linear Multilinear Algebra*, vol. 66, no. 6, pp. 1069–1084, 2018.

[38] **H. Derksen** and D. Masser, "Linear equations over multiplicative groups, recurrences, and mixing III", *Ergodic Theory Dynam. Systems*, vol. 38, no. 7, pp. 2625–2643, 2018.

[39] Z. Li, **H. Derksen**, J. Gryak, H. Ghanbari, P. Gunaratne, and K. Najarian, "A novel atrial fibrillation prediction algorithm applicable to recordings from portable devices", in *40th Intern. Conf. of the IEEE EMBC*, 2018, pp. 4034–4037.

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[43] **H. Derksen**, A. van den Essen, and W. Zhao, "The Gaussian moments conjecture and the Jacobian conjecture", *Israel J. Math.*, vol. 219, no. 2, pp. 917–928, 2017.

[44] **H. Derksen** and V. Makam, "Generating invariant rings of quivers in arbitrary characteristic", *J. Algebra*, vol. 489, pp. 435–445, 2017.

[45] **H. Derksen** and V. Makam, "Polynomial degree bounds for matrix semi-invariants", *Adv. Math.*, vol. 310, pp. 44–63, 2017.

[46] S. Ansari, N. Farzaneh, M. Heung, K. Oldham, **H. Derksen**, K. R. Ward, and K. Najarian, "Real-time detection of intradialytic hypotension using a novel polyvinylidene fluoride based sensor", in *IEEE-EMBS Intern. Conf. on BHI*, 2016.

[47] A. Belle, S. Ansari, M. Spadafore, V. Convertino, K. R. Ward, **H. Derksen**, and K. Najarian, "A signal processing approach for detection of hemodynamic instability before decompensation", *PLOS one*, vol. 11, no. 2, e014544, 2016.

[48] **H. Derksen**, "Matrix completion and tensor rank", *Linear Multilinear Algebra*, vol. 64, no. 4, pp. 680–685, 2016.

[49] **H. Derksen**, "On the nuclear norm and the singular value decomposition of tensors", *Found. Comput. Math.*, vol. 16, no. 3, pp. 779–811, 2016.

[50] M. Nejati, S. Samavi, **H. Derksen**, and K. Najarian, "Denoising by low-rank and sparse representation", *J. Vis. Commun. Imag. R.*, vol. 36, pp. 29–39, 2016.

[51] **H. Derksen** and J. Fei, "General presentations of algebras", *Adv. Math.*, vol. 278, pp. 210–237, 2015.

[52] **H. Derksen** and D. Masser, "Linear equations over multiplicative groups, recurrences, and mixing II", *Indag. Math. (N.S.)*, vol. 26, no. 1, pp. 113–136, 2015.

[53] **H. Derksen** and Z. Teitler, "Lower bound for ranks of invariant forms", *J. Pure Appl. Algebra*, vol. 219, no. 12, pp. 5429–5441, 2015.

[54] R. Fazlali, N. Karimi, S. M. R. Soroushmehr, S. Samavi, B. Nallamothu, **H. Derksen**, and K. Najarian, "Robust catheter identification and tracking in x-ray angiographic sequences", in *37th Intern. Conf.of the IEEE EMBC*, 2015, pp. 7901–7904.

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[59] **H. Derksen**, "The graph isomorphism problem and approximate categories", *J. Symbolic Comput.*, vol. 59, pp. 81–112, 2013.

[60] **H. Derksen** and D. Masser, "Linear equations over multiplicative groups, recurrences, and mixing I", *Proc. Lond. Math. Soc. (3)*, vol. 104, no. 5, pp. 1045–1083, 2012.

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[62] **H. Derksen** and J. Weyman, "The combinatorics of quiver representations", *Ann. Inst. Fourier (Grenoble)*, vol. 61, no. 3, pp. 1061–1131, 2011.

[63] **H. Derksen** and A. Fink, "Valuative invariants for polymatroids", *Adv. Math.*, vol. 225, no. 4, pp. 1840–1892, 2010.

[64] **H. Derksen** and A. Fink, "Valuative invariants for polymatroids", in *22nd International Conference on Formal Power Series and Algebraic Combinatorics (FPSAC 2010)*, ser. Discrete Math. Theor. Comput. Sci. Proc., AN, Assoc. Discrete Math. Theor. Comput. Sci., Nancy, 2010, pp. 271–282.

[65] **H. Derksen**, J. Weyman, and A. Zelevinsky, "Quivers with potentials and their representations II: Applications to cluster algebras", *J. Amer. Math. Soc.*, vol. 23, no. 3, pp. 749–790, 2010.

[66] **H. Derksen**, "Symmetric and quasi-symmetric functions associated to polymatroids", *J. Algebraic Combin.*, vol. 30, no. 1, pp. 43–86, 2009.

[67] **H. Derksen** and G. Kemper, "Computing invariants of algebraic groups in arbitrary characteristic", *Adv. Math.*, vol. 217, no. 5, pp. 2089–2129, 2008.

[68] **H. Derksen** and T. Owen, "New graphs of finite mutation type", *Electron. J. Combin.*, vol. 15, no. 1, Research Paper 139, 15, 2008.

[69] **H. Derksen**, J. Weyman, and A. Zelevinsky, "Quivers with potentials and their representations. I. Mutations", *Selecta Math. (N.S.)*, vol. 14, no. 1, pp. 59–119, 2008.

[70] Y. Ma, A. Y. Yang, **H. Derksen**, and R. Fossum, "Estimation of subspace arrangements with applications in modeling and segmenting mixed data", *SIAM Rev.*, vol. 50, no. 3, pp. 413–458, 2008.

[71] C. Chindris, **H. Derksen**, and J. Weyman, "Counterexamples to Okounkov's log-concavity conjecture", *Compos. Math.*, vol. 143, no. 6, pp. 1545–1557, 2007.

[72] **H. Derksen**, "A Skolem-Mahler-Lech theorem in positive characteristic and finite automata", *Invent. Math.*, vol. 168, no. 1, pp. 175–224, 2007.

[73] **H. Derksen**, "Hilbert series of subspace arrangements", *J. Pure Appl. Algebra*, vol. 209, no. 1, pp. 91–98, 2007.

[74] **H. Derksen**, C. Eggermont, and A. van den Essen, "Multimagic squares", *Amer. Math. Monthly*, vol. 114, no. 8, pp. 703–713, 2007.

[75] **H. Derksen**, A. Schofield, and J. Weyman, "On the number of subrepresentations of a general quiver representation", *J. Lond. Math. Soc. (2)*, vol. 76, no. 1, pp. 135–147, 2007.

[76] Y. Ma, **H. Derksen**, W. Hong, and J. Wright, "Segmentation of multivariate mixed data via lossy coding and compression", *IEEE Trans. on PAMI*, vol. 29, pp. 1546–1562, 2007.

[77] H. Rao, **H. Derksen**, R. Fossum, Y. Ma, A. Wager, and A. Yang, "The algebra and statistics of generalized principal component analysis", in *SPIE conference VCIP*, 2007.

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[79] **H. Derksen**, "Universal denominators of Hilbert series", *J. Algebra*, vol. 285, no. 2, pp. 586–607, 2005.

[80] **H. Derksen**, E. Jeandel, and P. Koiran, "Quantum automata and algebraic groups", *J. Symbolic Comput.*, vol. 39, no. 3-4, pp. 357–371, 2005.

[81] **H. Derksen** and J. Weyman, "Quiver representations", *Notices Amer. Math. Soc.*, vol. 52, no. 2, pp. 200–206, 2005.

[82] **H. Derksen**, "Constructive invariant theory", in *Invariant theory in all characteristics*, ser. CRM Proc. Lecture Notes, vol. 35, Amer. Math. Soc., Providence, RI, 2004, pp. 11–36.

[83] **H. Derksen**, "Degree bounds for syzygies of invariants", *Adv. Math.*, vol. 185, no. 2, pp. 207–214, 2004.

[84] **H. Derksen**, "Error-correcting codes and B_h-sequences", *IEEE Trans. Inform. Theory*, vol. 50, no. 3, pp. 476–485, 2004.

[85] **H. Derksen** and G. Kemper, "On global degree bounds for invariants", in *Invariant theory in all characteristics*, ser. CRM Proc. Lecture Notes, vol. 35, Amer. Math. Soc., Providence, RI, 2004, pp. 37–41.

[86] **H. Derksen** and J. Sidman, "Castelnuovo-Mumford regularity by approximation", *Adv. Math.*, vol. 188, no. 1, pp. 104–123, 2004.

[87] **H. Derksen**, "The fundamental theorem of algebra and linear algebra", *Amer. Math. Monthly*, vol. 110, no. 7, pp. 620–623, 2003.

[88] **H. Derksen**, *Restrictions of algebraic group representations to finite subgroups*, 2002.

[89] **H. Derksen** and J. Sidman, "A sharp bound for the Castelnuovo-Mumford regularity of subspace arrangements", *Adv. Math.*, vol. 172, no. 2, pp. 151–157, 2002.

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Presentations

University of Auckland, Colloquium — Auckland, New Zealand
Bi-Lipschitz Invariant Theory — March 2026

University of Auckland, Public Lecture — Auckland, New Zealand
Invariant Theory — March 2026

SLMath, Workshop on infinite dimensional division algebras — Berkeley, CA
Invariants for finite group actions on skew fields — December 2026

Simons Institute, Workshop on Randomness, Invariants, and Complexity — Berkeley, CA
Algebra problems coming from fundamental questions in Complexity Theory — November 2025

Simons Institute, Program on Complexity and Linear Algebra — Berkeley, CA
Applications of stability in Invariant Theory — November 2025

Simons Institute, Workshop on Matrix Multiplication — Berkeley, CA
Other subrank notions and their applications to and beyond matrix multiplication — October 2025

Jagiellonian University, Conference on Commutative Algebra and Representation Theory — Krakow, Poland
Bi-Lipschitz Invariant Theory — October 2025

University of Bielefeld, Conference: The legacy of Peter Gabriel — Bielefeld, Germany
GIT for quivers and free skew fields — August 2025

BIRS, Workshop on Noncommutative Function Theory — Banff, AB, Canada
Invariant Theory for quiver representations and noncommutative rank — May 2025

Lie Størmer Center, TiME Workshop — Tromsø, Norway
Computational Invariant Theory (2 lectures) — April 2025

RIMS, Conference: Perspective in tilting theory and related topics — Kyoto, Japan
Invariant Theory and quiver representations (3 lectures) — February 2025

Okinawa Institute of Science and Technology (OIST), Autumn School and Conference — Okinawa, Japan
Semi-invariants for quivers and free skew fields — November 2024

University of Massachusetts, Colloquium — Boston, MA
Invariants of Matrices — November 2024

Boise State University — Boise, ID
Simultaneous Conjugation of Tuples of Matrices (virtual) — October 2024

Technical University Eindhoven — Eindhoven, the Netherlands
Bi-Lipschitz Invariant Theory — September 2024

Technische Universität Berlin — Berlin, Germany
Bi-Lipschitz Invariant Theory — August 2024

Summer School Applications of Representation Theory in Topological Data Analysis & GIT — Montreal, QC, CA
GIT: Invariant Theory, Quiver Representations and Complexity (3 lectures) — June 2024

Isaac Newton Institute — Cambridge, UK
Computational Invariant Theory (3 lectures) — January 2024

IPAM reunion conference — Lake Arrowhead, CA
The subrank of a generic tensor — December 2023

IWOTA conference — Helsinki, Finland
Similarity of matrix tuples — July 2023

SIAM conference on Applied Algebraic Geometry — Eindhoven, the Netherlands
Simultaneous conjugation of tuples of matrices — July 2023

University of Bern — Bern, Switzerland
Wheeled PROPs — May 2023

Meeting on Applied Algebraic Geometry — Atlanta, GA
Invariant Theory and Field Theory for Computer Vision — April 2023

Workshop on Algebraic Complexity Theory — Warwick, UK
Orbit Problems — March 2023

AMS meeting — Atlanta, GA
Invariant Theory and Field Theory for Computer Vision — March 2023

Joint Mathematics Meeting, AMS Special Session — Boston, MA
Algebraic Methods for Tensor Data — January 2023

Conference Tensors:: Quantum Information, Complexity and Combinatorics — Montreal, QC, Canada
On the subrank of generic tensor — November 2022

IEEE Symposium on Foundations of Computer Science (FOCS) — Denver, CO
Using invariant theory to fool polynomials — October 2022

Institute of Advanced Study — Princeton, NJ
G-stable Rank and the Cap Set Problem — October 2022

SIAM Conference on the Mathematics of Data — San Diego, CA
Algebraic Methods for Tensor Data — September 2022

Computational Complexity Conference (CCC) — Philadelphia, PA
Subrank and Optimal Reduction of Scalar Multiplications to Generic Tensors — July 2022

Summer Meeting of the Canadian Mathematical Society — St. John's, NL, Canada
Multiparameter Landscapes — June 2022

Conference Algebraic Statistics, University of Hawaii — Manoa, HI
Maximum Likelihood Estimates for Matrix and Tensor Normal Models — May 2022

Workshop on Geometry and Complexity Theory — Toulouse, France
Computational invariant theory and complexity — April 2022

Conference in honor of William Crawley-Boevey, University of Bielefeld — Bielefeld, Germany
Generating semi-invariants for quiver representations (virtual — August 2021

AMS Sectional Meeting — Omaha, NE
Algorithms for orbits of quiver representations (virtual) — August 2021

University of Konstanz — Konstanz, Germany
Maximum Likelihood Estimates for Matrix and Tensor Normal Models (virtual — July 2021

Technical University of Berlin — Berlin, Germany
The non-commutative rank of a linear matrix (virtual) — June 2021

IPAM Workshop Efficient Tensor Representations for Learning and Computational Complexity — Los Angeles, CA
Invariant tensors and wheeled PROPs/Notions of orthogonality for tensors (virtual) — May 2021

Texas A& M University — College Station, TX
The G-stable Rank for Tensors — November 2020

University of Michigan — Ann Arbor, MI
Algorithms for Tensors and Applications — October 2020

Workshop on Symmetry, Randomness, and Computations in Real Algebraic Geometry — ICERM, Providence, RI
Algebraic Methods for Tensor Data — August 2020

AMS Meeting, University of Virginia — Charlottesville, VA
The G-stable Rank for Tensors and the Cap Set Problem — March 2020

University of Iowa, colloquium — Iowa City, IA
Applications of Tensor Rank — January 2020

Conference on Geometric Methods in Representation Theory — Columbia, MO
Invariant Theory and Wheeled PROPs — November 2019

Conference on Homological Methods and Tilting Theory of Finite Dimensional Algebras — Iowa City, IA
The Canonical Decomposition — August 2019

SIAM conference on Applied Algebraic Geometry — Bern, Switzerland
Algorithms for the separation of orbits of matrices — July 2019

Courant–CUNY — New York, NY
Singular Values of Tensors — February 2019

6th Conference on Geometric Methods in Representation Theory, University of Iowa — Iowa City, IA
Upper and Lower Degree Bounds for Generating Invariants — November 2018

AMS meeting, special session, University of Michigan — Ann Arbor, MI
An Algebraic Approach to Tensor Analysis — October 2018

Rutgers University, colloquium — New Brunswick, NJ
Constructive Invariant Theory — October 2018

Conference on Symmetry vs. Regularity (WL2018) — Pilsen, Chech Republic
The Graph Isomorphism Problem and the Module Isomorphism Problem — July 2018

International Symposium on Mathematical Programming (ISMP 2018) — Bordeaux, France
Polynomial and Tensor Optimization — July 2018

Institute of Advanced Study, Workshop on Optimization, Complexity and Invariant Theory — Princeton, NJ
An Introduction to Invariant Theory — June 2018

University of Illinois, colloquium — Chicago, IL
Constructive Invariant Theory — April 2018

North Carolina State University — Raleigh, NC
Matrix Invariants and Complexity — February 2018

Purdue University, colloquium — West Lafayette, IN
Constructive Invariant Theory and Non-Commutative Rank — January 2018

University of California — San Diego, CA
Constructive Invariant Theory and Non-Commutative Rank — January 2018

Joint Mathematics Meeting, SIAM session — San Diego, CA
Singular Values for Tensors — January 2018

Conference on Geometric Methods in Representation Theory — Iowa City, IA
Stability of Quiver Representations — November 2017

SIAM annual meeting — Pittsburgh, PA
Learning with Privileged Information and its Application in Medical Informatics — July 2017

Maurice Auslander Distinguished Lectures and **International Conference** — Falmouth, MA
Invariant Theory for Quivers — April, 2017

Radboud University — Nijmegen, the Netherlands
Matrix Invariants — February 2017

Conference on Geometric Methods in Representation Theory — Columbia, MO
Invariant Theory for Quivers — November 2016

Institute of Advanced Study — Princeton, NJ
Matrix Invariants and Algebraic Complexity Theory — October 2016

Simons Institute — New York, NY
Invariant Theory and Quiver Representations (2 lectures) — October 2016

Conference on Tensor Decompositions and Applications (TDA 2016) — Leuven, Belgium
Tensor Decompositions and the Nuclear Norm — January 2016

Conference on Representation Theory and Commutative Algebra, University of Connecticut — Storrs, CT
General Representations of Quivers — April 2015

Frontiers in Science Public Lecture, Florida Atlantic University — Boca Raton, FL
Sparsity in Big Data — March 2015

Chern Institute, School on Affine Algebraic Geometry and the Jacobian Conjecture — Tianjin, China
Locally Nilpotent Derivations (3 lectures) — July 2014

Simons Institute — Berkeley, CA
Generalized Singular Values — November 2014

Conference on Heights, Modularity Transcendence, CIRM — Luminy, France
Recurrence Sequences in Positive Characteristic — May 2014

Conference on Computational Nonlinear Algebra, CERM, Brown University — Providence, RI
Tensor Decompositions, Matrix Completion and Singular Values — May 2014

Syracuse University — Syracuse, NY
Isomorphism Problems — July 2013

Conference on Computational Algebraic Geometry — Kalamazoo, MI
Invariant Theory and Complexity — May 2013

Conference in honor of Andrei Zelevinsky, Northeastern University — Boston, MA
Minimal Presentations of Modules — April 2013

East Coast Computer Algebra Day, Oakland University — Rochester, MI
Invariants and Complexity — May 2012

Northeastern University, Colloquium — Boston, MA
(Poly)Matroid Invariants — January 2012

Temple University — Philadelphia, PA
Polymatroids — November 2011

SIAM Conference on Applied Algebraic Geometry, North Carolina State University — Raleigh, NC
Kruskal's Uniqueness Inequality is not Sharp — October 2011

University of Kent, Colloquium — Canterbury, UK
March 2011

Berkeley–Davis–Stanford Algebraic Geometry Colloquium — Berkeley, CA
Quotients of unipotent groups — February 2011

Queen's University — Kingston, ON, Canada
Counting Subrepresentations of quivers — February 2011

Mini-workshop on Polynomial Vector Fields — Oberwolfach, Germany
Algorithms for polynomial differential equations — December 2010

Western Michigan University, Colloquium — Kalamazoo, MI
October 2010

Conference on Convex Algebraic Geometry, Banff Institute — Banff, AB, Canada
Matroid Polytopes — February 2010

Katholieke Universiteit Nijmegen — Nijmegen, the Netherlands
(Poly)Matroid Invariants — February 2010

Conference on Cluster Algebras and Related Topics — Morelia, Mexico
Quivers with Potentials (3 lectures) — December 2008

University of Illinois, Colloquium — Urbana–Champaign, IL
Subspace Arrangements — November 2008

European Mathematical Congress — Amsterdam, the Netherlands
G-invariant Tensors — July 2008

University of Washington — Seattle, WA
Symmetric and Quasi-Symmetric Functions Associated to Polymatroids — April 2008

Workshop Combinatorial Representation Theory, MSRI — Berkeley, CA
Quivers with Potentials — March 2008

University of California, Colloquium — San Diego, CA
Generators of Invariant Rings — December 2007

Wayne State University, Colloquium — Detroit, MI
Generators of Invariant Rings — October 2007

Texas A& M — College Station, TX
A Counterexample to Okounkov's Log-Concavity Conjecture — September 2007

Texas A& M, Colloquium — College Station, TX
Mutations of Quivers — September 2007

ICRA XII — Torun, Poland
A Counterexample to Okounkov's Log-Concavity Conjecture — August 2007

Workshop, Topics in Combinatorial Representation Theory, MSRI — Berkeley, CA
Quivers with Potentials — March 2007

Valley Geometry Seminar, University of Massachusetts — Amherst, MA
Generators of Invariant Rings — February 2007

SPIE conference on VCIP — San Jose, CA
Segmentation of Multivariate Mixed Data via Lossy Coding and Compression — January 2007

IMA Workshop on Algorithms in Algebraic Geometry — Minneapolis, MN
Algorithms for Invariant Rings of Algebraic Groups — September 2006

Conference on Castelnuovo-Mumford Regularity and Related Topics, CIRM — Luminy, France
Hilbert Series of Subspace Arrangements — May 2006

Lie Days — Martina Franca, Italy
LR Coefficients which are equal to 1 — May 2006

University of Western Ontario, Colloquium — London, ON, Canada
Subspace Arrangements — March 2006

Conference on Heights in Diophantine Geometry, Erwin Schrödinger Institute — Vienna, Austria
A Skolem-Mahler-Lech Theorem in Positive Characteristic — March 2006

Diamant/Eidma Symposium — Mierlo, the Netherlands
Rational Invariant Theory — November 2005

AMS Summer Institute on Algebraic Geometry — Seattle, WA
Quivers and Combinatorics — August 2005

Vrije Universiteit Amsterdam — Amsterdam, the Netherlands
Rational Invariant Theory — May 2005

University of Zürich — Zürich, Switzerland
Rational Invariant Theory — April 2005

Conference on Algebraic Geometry and Algebraic Groups — Aarhus, Denmark
Universal Denominators of Hilbert Series — June 2004

Conference on Transformation Groups — Basel, Switzerland
May 2004

2nd Latin American School and Workshop on Polynomimal Systems — Angra dos Reis, Brazil
Rational Invariant Theory — March 2004

Berkeley-Stanford joint Algebraic Geometry Seminar — Berkeley, CA
Castelnuovo-Mumford Regularity of Subspace Arrangements and Invariant Theory — February 2004

International Conference on Commutative Algebra and Combinatorics — Allahabad, India
December 2003

University of Toronto — Toronto, ON
November 2003

Northeastern University — Boston, MA
October 2003

Midwest Lie Theory Conference — Eau Claire, WI
Hilbert Series of Invariant Rings — September 2003

University of Wisconsin — Madison, WI
September 2003

Workshop Darstellungstheorie endlichdimensionaler Algebren — Oberwolfach, Germany
Semi-Invariants for Quivers (lecture series) — April 2003

Workshop, MSRI — Berkeley, CA
Applications of Quiver Representations II — February 2003

ICRA X — Toronto, ON, Canada
Invariant Theory for Quivers (lecture series) — July 2002

Workshop on Invariant Theory — Kingston, ON, Canada
Invariant Theory (lecture series) — April 2002

Workshop on Integrable Models, Combinatorics and Representation Theory, RIMS — Kyoto, Japan
Quiver Representations and LR-Coefficients — August 2001

Northeastern University — Boston, MA
Record Breaking Codes / Quivers and LR-Coefficients — May 2001

Conference on Algebraic Groups — Oberwolfach, Germany
March 2001

Queen's University — Kingston, ON, Canada
Semi-Invariants of Quivers and Klyachko's Saturation Problem — February 2001

Summer School on Geometry of Quiver Representations — Isle of Thorns, England
On the σ-Stable Decomposition — September 2000

ICRA IX — Beijing, China
On the σ-Stable Decomposition of Dimension Vectors — August 2000

Rutgers University — Piscataway, NJ
Semi-Invariants of Quivers and Klyachko's Saturation Problem — January 2000

University of Michigan — Ann Arbor, MI
Semi-Invariants of Quivers and Klyachko's Saturation Problem — January 2000

Yale University — New Haven, CT
Semi-Invariants of Quivers and Klyachko's Saturation Problem — November 1999

Conference Representations de Groupes Algébriques
November 1999

Poly '99 — Krakow, Poland
The Automorphism Group of $\mathbf{C}^n$ is Small — July 1999

Conference Groupes de Galois différentiels, CIRM — Luminy, France
Constructive Invariant Theory — February 1999

MSRI — Berkeley, CA
Constructive Invariant Theory — October 1998

MEGA 98 — Saint Malo, France
Constructive Invariant Theory — June 1998

Princeton University — Princeton, NJ
Semi-Invariants of Quivers and Klyachko's Saturation Problem — April 1999

Northeastern University — Boston, MA
Semi-Invariants of Quivers and Klyachko's Saturation Problem — April 1998

Massachusetts Institute of Technology — Cambridge, MA
Constructive Invariant Theory — April 1998

AIDA Workshop — Nunspeet, the Netherlands
Constructive Invariant Theory — March 1998

Florida State University — Tallahassee, FL
Computation of Reductive Group Invariants / Polynomial Bounds for Invariant Rings — February 1998

Brandeis University — Waltham, MA
The Holomorphic Linearization Problem — October 1997

McGill University — Montreal, QC, Canada
Computation of Reductive Group Invariants — October 1997

Algebra Tagen — Bern, Switzerland
The Holomorphic Linearization Problem — June 1997

Conference on Invariants and Representations of Algebras — Essen, Germany
Computation of Reductive Group Invariants — April 1997

Conference Groupes Algébriques de Transformations, CIRM — Luminy, France
The Holomorphic Linearization Problem — October 1996

University of Innsbruck — Innsbruck, Austria
The Linearization Problem — October 1996

Summer School — Monastir, Tunisia
Constructive Invariant Theory (2 lectures) — July 1996

Heidelberg University — Heidelberg, Germany
Computation of Reductive Group Invariants — July 1996

Conference Computational Invariant Theory — Dagstuhl, Germany
Computation of Reductive Group Invariants — May 1996

University of Nijmegen — Nijmegen, the Netherlands
Computation of Reductive Group Invariants — September 1995

Contact Franco-Belge — Reims, France
Computation of Reductive Group Invariants — June 1995

Conference Automorphisms of Affine Spaces — Curaçao, the Netherlands Antilles
Quotients of Reductive Group Actions — July 1994

Institute Henri Poincaré — Paris, France
The Kernel of a Derivation — December 1993

Jagiellonian University — Krakow, Poland
The Kernel of a Derivation / Inverse Degrees and the Jacobian Conjecture — October 1993