Cigole Thomas

Curriculum vitae

Department of Mathematics,
Colorado State Univesity,
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Work Experience

August 2022 - Present	Postdoctoral Fellow, Colorado State University Mentor: Prof. Rachel Pries
Spring 2016 - Summer 2022	Graduate Teaching Assistant, Graduate Lecturer George Mason University

Education

2018 - 2022	Ph.D. in Mathematics | George Mason University, Virginia Advisor: Prof. Sean Lawton
2016 - 2018	MS in Mathematics | George Mason University, Fairfax, Virginia
2010 - 2015	Integrated BS - MS in Mathematics | Indian Institute of Science Education and Research Mohali (IISER), India

Research Interests

Algebraic Geometry | Arithmetic Dynamics on Character Varieties | Number Theory
Mathematics Education | Data Learning using Algebraic Varieties

Preprints and Publications

1. C. Thomas. *Arithmetic dynamics on character varieties of free-type groups* (Under review. Prepared for volume "Advances in Complex Lagrangians, Integrable systems and Quantization")
2. T. Day, R. DeLand, J. Juul, Swati, C. Thomas, B. Thompson, and B. Tobin. *Dynamical Irreducibility of Certain Families of Polynomials over Finite Fields*
http://arxiv.org/abs/2409.10467
3. C. Thomas. *Asymptotic Dynamics on Character Varieties over Finite Fields* (Submitted.)
4. J. Jauchen, H. Klawa, L. Nguyen, R. R.G., E. Sander, P. Seshaiyer and C. Thomas. *Graduate Learning Assistants in the Mathematical Sciences: A new approach to core graduate classes*
PRIMUS (Problems, Resources, and Issues in Mathematics Undergraduate Studies), 33:8, 819-840, https://doi.org/10.1080/10511970.2023.2172751
5. G. Gongopadhyay and C.Thomas. *Decomposition of complex hyperbolic isometries by involutions.*
Linear Algebra and its Applications Volume 500, 1 July 2016, Pages 63-76.
https://doi.org/10.1016/j.laa.2016.03.011

Conference Proceedings:

1. R. R.G., H. Klawa, C. Thomas, L. Nguyen, J. Jauchen, P. Seshaiyer and E. Sander. *ON DEMAND: Graduate Assistants supporting active learning in graduate classrooms.* Innovations in Teaching and Learning Conference Proceedings Vol. 13 (2021).
DOI: https://doi.org/10.13021/itlcp.2021.3007

2. M. Broeckelman-Post, L. Fernandez, T. Polk, J. Hwang, C. Thomas, B. Stewart, S. Tuckerman, S. Hassell-Goodman, S.Taylor, K. Nordin, N. Brophy; A. Hingle; E. R.C. Staudt. *WORKSHOP: [For GTAs] Engaging Students and Giving Feedback as a GTA.* Innovations in Teaching & Learning Conference Proceedings Vol. 12 (2020).
DOI: https://doi.org/10.13021/itlcp.2020.2857

Awards and Fellowships

Spring 2022	**Clarke Family Award for Excellence in Analysis, Algebra or Topology**, George Mason University (GMU)
Spring 2022	**Dissertation Completion Grant** Instituted by Office of Provost, GMU
Aug 2021 - Dec 2022 & Aug 2018 - Aug 2019	**Industrial Immersion Program (IIP) Fellowship** Funded by George Mason University's Provost Graduate Education Office
Summer 2021 & Summer 2020	**Summer Research Fellowship** Instituted by Office of Provost, GMU
Spring 2021	**Doctoral Research Scholars Fellowship** Instituted by Office of Provost, GMU
Aug 2019 - May 2020	**Graduate Research Assistant** for the project, NSF-IUSE (Improving Undergraudate STEM Education) at GMU
May 2018	**T.C. Lim Award for Excellence in Teaching** Awarded by Department of Mathematics, GMU.
May 2016	**INSPIRE Fellowship for PhD** instituted by Department of Science and Technology, Government of India (Not availed)
July 2015 - August 2015	**Research Experience for Graduate Student (REGS)** By GEomteric Structures And Representation Varieties (GEAR)
August 2010 - May 2015	**INSPIRE - SHE Fellowship** (Roll No: 259S/2010) Instituted by Department of Science and Technology (DST), Government of India
June 2012 - August 2012	**Undergraduate Summer Fellowship** INnovation in Science Pursuit for Inspired REsearch (INSPIRE), DST India Location: National Centre for Biological Sciences (NCBS), India

Research Experience

Summer 2018 - May 2022	**PhD Thesis Research** Advisor: Prof. Sean Lawton Topic: *Stratification and Arithmetic Dynamics on Character Varieties*
Aug 2020 - Dec 2020	**Graduate Research Assistant** Industrial Immersion Program (IIP), George Mason University Topic: *Algebraic Varieties and Neural Networks* Advisor: Prof. Sean Lawton
Aug 2018 - Aug 2019	**Graduate Research Assistant** Industrial Immersion Program (IIP), George Mason University Topic: *Learning Algebraic Varieties* Advisor: Prof. Sean Lawton and Dr. Jeff Byers (Naval Research Academy)
Spring 2016 - Fall 2018	**Graduate Intern** Mason Experimental Geometry Lab (MEGL), GMU Advisor: Prof. Sean Lawton Project: *Arithmetic Dynamics of Moduli Spaces*
June 2015 - August 2015	**Graduate Intern** Research Experience for Graduate Student (REGS) by GEAR at MEGL Advisor: Dr. Christopher Manon Project: *Experiments with Character Varieties*
May 2014 - May 2015	**MS Thesis Research** Indian Institute of Science Education and Research Mohali, India Advisor: Dr. Krishnendu Gongopadhyay Topic: *Decomposition of complex hyperbolic isometries by involutions.*

Teaching Experience

Spring 2024	**Instructor of Record**	Math 369
		Linear Algebra 1
Fall 2023	**Instructor of Record**	Math 360
		Mathematics of Information Security
		Math 369
Spring 2023	**Instructor of Record**	Math 360
		Math 301
		Introduction to Combinatorics
Fall 2022	**Instructor of Record**	Math 360
Summer 2022	**Instructor of Record**	Math 203
		Linear Algebra
Fall 2020	**Graduate Learning Assistant**	Math 621
	(Online)	Algebra (Graduate)
Spring 2020	**Graduate Teaching Assistant**	Math 114
	(Online for second half of semester)	Analytic Geometry and Calculus II
Fall 2019	**Graduate Teaching Assistant**	Math 114
Summer 2019	**Graduate Student Lecturer**	Math 113
		Analytic Geometry and Calculus I
Summer 2018	**Instructor of Record**	Math 125
		Discrete Mathematics I
Spring 2018	**Graduate Teaching Assistant**	Math 113
Fall 2017	**Graduate Teaching Assistant**	Math 114
Summer 2017	**Instructor of Record**	Math 108
		Introductory Calculus with Business Applications
Spring 2017	**Graduate Teaching Assistant**	Math 114
Fall 2016	**Graduate Teaching Assistant**	Math 114
Summer 2016	**Instructor of Record**	Math 108
Spring 2016	**Graduate Teaching Assistant**	Math 114

Active Learning Experience

- Teaching - NSF - Improving Undergraudate STEM Education (IUSE) project at GMU

  ○ Graduate Research Assistant : June 2019 - May 2020 . Duties include:
    * Developing Inquiry Based Learning (IBL) worksheets to promote group work and discussion among students for Calculus 1 and Calculus 2.
    * Co-organizing biweekly teaching seminars to discuss the challenges and progress of the implementation of IBL worksheets in recitations.
    * Coordinating other teaching assistants involved in IUSE project.

- Ran problem sessions using active learning for Graduate Algebra course in Fall 2020 as a Learning Assistant.

- Developed IBL type worksheets for Graduate Algebra Course based on problems for the Graduate Preliminary Examination.

Presentations and Talks

January 2025	(Upcoming) **JMM 2025**, Session: Arithmetic Dynamics of Single and Multiple Maps
March 2024	**Number Theory Lab**, CSU (With Jamie Juul)
	Dynamical irreducibility of certain families of polynomials
January 2024	**Institute Colloquium**, University of Denver
September 2023	**AWM Symposium**, Session: Women in Groups, Geometry, and Dynamics
June 2023	Plenary Speaker: **Workshop and school on Complex Lagrangians, Integrable Systems, and Quantization**, University of Oxford
April 2023	Speaker and Panelist: **Colorado Conference for Underrepresented Students in Mathematics**, *Dynamics of Group Action on Varieties*, Colorado State University
March 2023	**Topology Seminar**, Colorado State University
	Data Learning using Varieties
December 2022	**Postdoc Seminar**, Colorado State University (CSU)
	Arithmetic Dynamics of Group Actions on Varieties
November 2022	**Number Theory Lab**, CSU
	Markoff Triples
November 2022	**Workshop in Genetics**, Iowa State University
	How to create a website using GitHub (Virtual)
October 2022	**Front Range Number Theory Day**, University of Colorado at Boulder
	Counting Points on Character Varieties over Finite Fields
October 2022	**FRAGMENT(Front Range Algebra GeoMEtry & Number Theory)**,CSU
	Arithmetic Dynamics on Character Varieties
April 2022	**AMS Contributed Paper Session on Algebraic and Arithmetic Geometry and Commutative Algebra, JMM** (Virtual)
	Dynamics of the Outer Automorphism Group Action on Certain Character Varieties over finite fields.
April 2022	Poster session of **AWM Special Session on Women in Geometry, JMM**
	Dynamics of Outer Automorphism group action on $\mathrm{SL}_2(\mathbb{F}_q)$-*Character Variety of* $\mathbb{Z}^r$.(Virtual) Selected Best Poster.
April 2022	**Combinatorics, Algebra and Geometry Seminar**, GMU
	Arithemetic Dynamics on Character Varieties
March 2022	**Student Research Talks**, GMU
	Stratification and Arithemetic Dynamics on Character Varieties
March 2022	The **Three Minute Thesis** (3MT), GMU
	Motion of Points on Varieties
February 2022	**IISER Math Alumni Talk** (Virtual), Indian Institute of Science Education and Research Mohali, India
	Dynamics of Group Action on Character Varieties
January 2022	**Student Research Talks, IIP Presentations**, George Mason University
	Varieties in Data Learning
November 2021	**Binghamton University Graduate Conference in Algebra and Topology (BUGCAT) 2021** (Virtual)
	Asymptotic Transitivity of Outer Automorphism Group Action on Character Varieties over Finite Fields.
November 2021	**Student Research Talks**, George Mason University (GMU)
	Asymptotic Transitivity of Dynamics on Character Varieties
October 2021	The **3rd JNU-KAIST Geometry Topology Fair**, (Virtual)
	Talk 1: *An Introduction to Character Varieties*

	Talk 2: *Dynamics of the outer automorphism group action on finite field points of character varieties* (Invited)
September 2021	**Innovations in Teaching and Learning Conference (ITL)**, GMU
	On-Demand Video Session
	Graduate Assistants Supporting Active Learning in Graduate Classrooms (co-presentor with Hannah Klawa and Long Nyguen.)
March 2021	The **Three Minute Thesis** (3MT), GMU
	Dynamics of Mapping Class Group Action on Character Varieties
December 2020	**IIP Talks**, George Mason University
	Algebraic Varieties and Neural Networks.
November 2020	**Binghamton University Graduate Conference in Algebra and Topology**, **BUGCAT 2020** (Virtual)
	Conjugacy classes of polystable unimodular commuting matrices over finite fields
September 2020	**Innovations in Teaching and Learning (ITL) Conference**, GMU (Virtual)
	Panelist for '*Engaging Students and Giving Feedback as a GTA*'(Invited)
July 2020	**Geometry Labs United**, ICERM Brown.
	A Glimpse into a MEGL Project (Virtual).
March 2020	**Topology Seminar**, George Washington University (Invited)
	The Character Varieties of Torus knots.
Spring 2018	**Student Research Talks**, George Mason University
	An Introduction to Character Varieties.
Spring 2018	**Topology Seminar**, George Washington University (Invited)
	On SL(2,$\mathbb{C}$) Character Varieties.
Fall 2016	**Student Research Talks**, George Mason University
	Decomposition of Complex Hyperbolic Isometries by Involution.
Summer 2015 - Fall 2018	**MEGL Symposium**, George Mason University
	Talks and Poster Presentations with Mason Experimental Geometry Lab Research Team (jointly with undergraduate students)

Travel Grants and Funded Conferences

- April 2022: *AWM Funding* to present a poster at AWM Poster Session, JMM
- January 2022: *AMS Grad Student Travel Grant* to attend JMM, 2022.
- January 2022: GMU *Graduate Student Travel Grant* to present at JMM 2022.(Didn't avail)
- July 2021: Funding to attend Mathematical Congress of America organized by Mathematical Association of America
- July 2021: *Motivic Homotopy*, Park City Advanced Mathematics Institute 2021 Graduate Summer School (PCMI 2021)
- March 2019: *Workshop on the Geometry and Physics of Higgs bundles IV*, Simons Center for Geometry and Physics (SCGP)
- May 2019: *Current trends on spectral data for Higgs bundles V*, Simons Center for Geometry and Physics (SCGP)
- June 2018: *RTG Workshop on the Geometry and Physics of Higgs bundles III* , University of Illinois at Chicago (UIC)
- November 2017: *RTG Workshop on the Geometry and Physics of Higgs bundles II*, University of Illinois at Chicago
- January 2017: AMS-MRC funding to attend Joint Mathematical Meetings, Atlanta
- October 2016: *Workshop on the Geometry and Physics of Higgs bundles I*, University of Illinois at Chicago
- June 2016: *Character Varieties: Experiments and New Frontiers* as part of the AMS: Mathematics Research Committees - 2016, Snowbird, Utah

- October 2015: *Topology and Groups*, Goa University, India
- August 2015: Selected with funding for poster presentation at *Advanced School and Workshop on Geometry of Discrete Actions*, International Centre for Theoretical Physics, Trieste, Italy (Didn't attend)
- December 2014: ATM Workshop on *Lattices: Geometry and Dynamics*, IISER Mohali, India
- December 2014: *International Workshop of Geometry and Analysis on Hyperbolic Geometry*, Delhi University, India

Professional Services and Outreach

1. **Hiring Committee Member:** Summer 2022 for the position of Mason Experimental Geometry Lab Outreach Director (Term Assistant Professor).

2. **Diversity, Equity and Inclusion**

   - **Panelist:** Fall 2023
     Experience as a Woman in Mathematics and Academia
     organized by Association for Women in Mathematics, Colorado State University

   - **Committee Member:** Spring 2021, Spring 2022
     Graduate student representative in the *GMU College of Science Diveristy, Equity and Inclusion subcommittee for Graduate Student Recruitment, Retention, and Degree Attainment* to outline and propose a plan to support undergraduates, graduate students, faculty and staff who have been historically marginalized in STEM fields (Spring 2021).

   - Part of the *Association for Women in Mathematics (National Chapter)* group of *Capitol Hill Visit* in November 2018. The purpose of the visit was to engage in discussions with legislators/legislative staffers advocating for Women in STEM. See Article 16, '*Advocating for STEM: A Capitol Idea!*' from AWM Newsletter for details of this visit.

3. **Reviewer**

   - Reviewer for Innovations in Teaching and Learning (ITL) conference proposals at GMU
   - Reviewer for Spring 2020 Mason Core Assessment: Natural Sciences

4. **Professional Organizations**

   - American Mathematical Society (AMS) National Chapter : Member
   - Mathematical Association of America (MAA) : Member
   - **Association for Women In Mathematics (GMU Chapter)**
     * Vice President: 2020 - 2022, 2016 - 2017
     * President: 2018 - 2020
     * Treasurer: 2017 - 2018
   - Society for Industrial and Applied Mathematics (SIAM) National Chapter : Member (till 2022)
   - Women of Color in STEM (GMU Chapter) : Member till 2022

5. **Mentoring and Outreach**

   - August 2020 - May 2022: Mentor for three incoming PhD students as part of the peer mentor program instituted by Department of Mathematics at GMU
   - Spring 2018 - Spring 2022 : Met with prospective graduate students
   - Spring 2018 : Volunteer for new graduate student orientation
   - **Mason Experimental Geometry Lab (MEGL)**
     ○ Graduate Lab Manager : Spring 2019, Fall 2019, Spring 2020

- ○ Volunteer for MEGL Outreach for school students: Spring 2016 - Spring 2020
- ○ Graduate student mentor for research team of undergraduates in Summer 2015, Spring 2016, Fall 2016, Summer 2016, Spring 2017, Fall 2017 and Spring 2018

- **Mathematics Outreach**
  - ○ April 2021 : Panelist: Virtual outreach session organized by '*Math Initiatives in Nepal*' as part of Kovalesky day in Nepal
  - ○ Spring 2017 and Spring 2018: Co-organizer of outreach events for girl students from Highschool (as Vice president and Treasurer of AWM)
  - ○ Volunteer for multiple outreach activities organized my MEGL at elementary, middle, high schools and library including the Nifty-Fifty event at the Department of Homeland Security for S&T/CWMD Kids day
  - ○ Spring 2016 and Spring 2018: Volunteer at the SIAM booth at USA Science and Engineering Festival
  - ○ Spring 2017: Volunteer as Crowd counter for National Math Festival
  - ○ Feb 2017, Feb 2018 and Feb 2019: Grader for MATHCOUNTS

6. **Seminars and Conferences Organized**

    - Co-organizer: **Number Theory Lab, Colorado State University:** Fall 2022 - Fall 2024
    - Co-organizer: **Postdoc Seminar, Colorado State University:** Fall 2022 - Spring 2024
    - Chair : **AMS Contributed Paper Session on Algebraic and Arithmetic Geometry and Commutative Algebra**, JMM 2022 (Virtual)
    - Co-organizer : **AWM/IIP Talk** at GMU by Dr. Anne Costolanki on '*Navigating a technical career as a woman in STEM*'- Nov 2021 (Virtual)
    - Organizer : **AWM Young Mathematician Talk** at GMU - April 2021 (Virtual)
    - **StReeTs(Student Research Talks) Seminar Series at GMU**
      - ○ Organizer - Fall 2018
      - ○ Co-organizer - Spring 2019, Fall 2019, Spring 2020
    - Conference Organization
      - ○ Volunteer for **East Coast Optimization Meeting (ECOM)** in 2019 and 2020. Duties included securing partial funding from GMU and helping out with organization
      - ○ Co-organizer for one day workshop on '**Professional Development Event**' at GMU in March 2017 in the capacity as the Vice President of AWM
      - ○ Assistant to Organizers for **Mathematics Research Communities (MRC)** conference on *Character Varieties: Experiments and New Frontiers* by AMS in June 2016
      - ○ Volunteer for **Advanced Training in Mathematics Workshop** on *Lattices: Geometry and Dynamics* at IISER Mohali, India in December 2014

7. **Disability Services**

    - Reader for Office of Disability Services: Duties include recording chapters of books for Homological Algebra, Equivariant K-Theory, Category Theory and Introduction to Algebraic Geometry

8. **Organizing Social Events - Math Department**

    - Spring 2022: Co-organized **Lunch with AWM**
    - Spring 2019 and Spring 2020(Virtual) : Co-organized **AWM Social**
    - Fall 2019 and Fall 2017 : Co-organized **AWM Math Hike**
    - Fall 2017, Fall 2018, Fall 2019, Fall 2020 (Virtual), Fall 2021: Co-organized **AWM Hot Chocolate Event**. Duties included securing funding and coordinating the event.

- Fall 2019: Helped coordinate the **Departmental Tea/Coffee Time** organized by the Department of Mathematical Sciences, GMU.
- Spring 2019: Co-organized **AWM Potluck and Movie Night** for graduate students.

References

Available upon request.

*Last updated: September 18, 2024.