# Christian Krogager Zickert

Contact Information	Department of Mathematics +1 301-405-5072 (office) Mathematics Building zickert@umd.edu University of Maryland http://math.umd.edu/~zickert College Park, MD, 20742, USA
Personal Information	Born October 30, 1980, in Struer, Denmark
Research Interests	My primary research interests are representation varieties, cluster algebras, and polylogarithms.
Employment	University of Maryland, College Park
	Associate Professor, July 2017 - Assistant Professor, July 2011 - June 2017
	University of California, Berkeley
	Morrey Assistant Professor, July 2008 - June 2011
	• Postdoctoral sponsor: Ian Agol
	Max Planck Institute for Mathematics, Bonn, Germany
	Visiting position, Feb 1 - May 31, 2009
Education	Columbia University, New York
	Ph.D. in Mathematics (with distinction), May 2008
	• Dissertation title: Hyperbolic 3-manifolds and the Cheeger-Chern-Simons
	<ul><li><i>class</i></li><li>Advisor: Walter D. Neumann</li></ul>
	Aarhus University, Denmark
	M.S. in Mathematics, June 2005
	<ul> <li>Thesis title: A dilogarithmic formula for the Cheeger-Chern-Simons class</li> <li>Advisor: Johan L. Dupont</li> </ul>
	B.S. in Mathematics, June 2002
	<ul><li>Thesis title: The fundamental group and de Rham cohomology</li><li>Advisor: Johan L. Dupont</li></ul>

Awards and Grants	<b>NSF grant (PI)</b> , Character varieties and cluster mutations, DMS-1711405, 2017-2021
	<b>NSF grant (PI)</b> , Representations of 3-manifold groups, DMS-1309088, 2013-2017
	<b>NSF grant (PI)</b> , The volume and Chern-Simons invariant in topology and number theory, DMS-1007054 (DMS-1145374 after relocation), 2010-2013
	<b>GEAR conference grant</b> , <i>Curve-2015</i> , conference at Institut de Mathéma- tiques de Jussieu, Paris, France, 2015
	<b>Rejselegat for Matematikere</b> (Traveling Scholarship for Mathematicians), full scholarship to Columbia University covering tuition, fees and living expenses, 2005-2008
PUBLICATIONS AND PREPRINTS	Z. Greenberg, D. Kaufman, H. Li, C. Zickert, Hopf algebras of multiple polylogarithms, and holomorphic 1-forms, arXiv:2211.08337
	Z. Greenberg, D. Kaufman, H. Li, C. Zickert, The Lie coalgebra of mul- tiple polylogarithms, J. Algebra 645 (2024) 164–182
	C. Zickert, Holomorphic polylogarithms and Bloch complexes, J. Reine Angew. Math. 797 (2023) 155–192
	J. Cho, S. Yoon, C. Zickert, On the Hikami-Inoue conjecture, Algebr. Geom. Topol. 20 (2020) 279–301
	C. Zickert, Fock-Goncharov coordinates for rank 2 Lie groups, Math. Z. 294 (2020) 251–286
	M. Goerner, C. Zickert, Triangulation independent Ptolemy varieties, Math. Z. 289 (2018) 663–693
	<b>S. Garoufalidis, C. Zickert</b> , The symplectic properties of the $PGL(n, \mathbb{C})$ -gluing equations, Quantum Topol. 7 no. 3 (2016) 505–551
	C. Zickert, Ptolemy coordinates, Dehn invariant, and the A-polynomial, Math. Z. 283 (2016) 515-537
	<b>S. Garoufalidis, D. Thurston, C. Zickert</b> , The complex volume of $SL(n, \mathbb{C})$ -representations of 3-manifolds, Duke Math. J. 164 no. 11 (2015) 2099–2160,
	S. Garoufalidis, M. Goerner, C. Zickert, Gluing equations for $PGL(n, \mathbb{C})$ - representations of 3-manifolds, Algebr. Geom. Topol. 15 (2015) 565–622
	S. Garoufalidis, M. Goerner, C. Zickert, The Ptolemy field of 3-manifold-

	representations, Algebr. Geom. Topol. 15 (2015) 371–397
	C. Zickert, The extended Bloch group and algebraic K-theory, J. Reine Angew. Math. 704 (2015) 21–54
	<b>C. Zickert</b> , The volume and Chern-Simons invariant of a representation, Duke Math. J. 150 no. 3 (2009) 489–532,
	S. Goette, C. Zickert, The extended Bloch group and the Cheeger-Chern- Simons class, Geom. Topol. 11 (2007) 1623–1635
	J. Dupont, C. Zickert, A dilogarithmic formula for the Cheeger-Chern- Simons class, Geom. Topol. 10 (2006) 1347–1372
Thesis supervision	Haoran Li, PhD 2024 (expected)
	Zachary Greenberg, PhD 2021, Postdoc at Heidelberg (2022-2024)
	<b>Dani Kaufman</b> , PhD 2021, Postdoc at Heidelberg (fall 2021) and Copenhagen (2022-2025)
	<b>Stephen Gilles</b> , PhD 2021, Research Computer Scientist at the Space Research Division of Southwest Research Institute in Austin, TX
	<b>Ryan Kirk</b> , PhD 2019, Teaching Instructor at East Carolina University
	Laura Iosip, PhD (quit the program in 2021 for personal reasons)
REU	Cluster algebras and polylogarithm relations, summer 2023
	3-manifolds, triangulations and volume computations, summer 2014
Mentoring	Masters exam advisor (non-thesis option) for Laura Iosip, University of Maryland, $2016$
	Mentor for Yousheng Shi, University of Maryland, fall 2014
	Postdoctoral supervisor for Matthias Goerner, University of Maryland, spring 2012. Matthias is now a software developer at Pixar Animation Studios.
Professional Service	Math admissions committee, 2023, 2024
	Chair of the geometry and topology field committee, 2020-present.
	PhD exam committee for Zhao Liu (2022), Nathaniel Monson (2022), Robert Maschal (2017), Jean-Philippe Burelle (2017), Gregory Laun (2016)

	Preliminary PhD exam committee for Jianlong Liu (2019), Charles Daly (2018), Corry Bedwell (2017), Tianyu Ma (2014)
	Policy committee, 2023-2024, 2017-2018, 2013-2014
	Merit pay committee, 2015
	NSF panel service, Feb 2015, Dec 2023
Organizing	Coorganizer of <i>Polylogarithms</i> , <i>Cluster Algebras</i> , and <i>Scattering Amplitudes</i> , workshop at the BRIN Center, University of Maryland, September 11-15, 2023
	Coorganizer of <i>Curve-2015</i> , conference on representations of 3-manifold groups, geometric structures and exact computations, Institut de Mathématique de Jussieu, Paris, France, June 22-26, 2015
	Coorganizer of Second GEAR network retreat, University of Maryland, March 17-21, 2014
	Organizer of Geometry-Topology seminar, University of Maryland, spring 2014, spring 2012
	Coorganizer of Geometry-Topology seminar, University of Maryland, fall 2019, fall 2013, spring 2013, fall 2012
Outreach	Organizer of a demonstration on scissors congruence, Maryland day, community outreach event, April 29, 2017
	Organizer of a demonstration on scissors congruence, Maryland day, community outreach event, April 30, 2016
	Polygons, presentation at Howard County Math Festival, Centennial High School, November 10, 2015
	Presentation for first graders on polygons and polyhedra, Takoma Education Campus, May 29, 2015
	Organizer of a demonstration on scissors congruence, Maryland day, community outreach event, April 25, 2015
	Keynote speaker at Math night, Takoma Education Campus, Jan 15, 2015
	Polygons, polyhedra and scissors congruence, minicourse for high school teachers, June 23-27, 2014
	Organizer of a demonstration on scissors congruence, Maryland day, community outreach event, April 26, 2014

*Fun with shapes*, presentation at Howard County Math Festival, Centennial High School, January 29, 2014

Organizer of a demonstration on scissors congruence, Maryland day, community outreach event, April 27, 2013

### INVITED Conferences and workshops TALKS

Mathematical Aspects of N=4 Super-Yang-Mills Theory, Simons Center for Geometry and Physics, Stony Brook, NY, February 26-March 1, 2024

*Knots in Washington 49.96875*, George Washington University, Washington DC, Dec 8-10, 2023 (plenary speaker)

Geometries and Special Functions for Physics and Mathematics, Bethe Center for Theoretical Physics, Bonn, Germany, March 20-24, 2023

Reflections on Geometry: 3-Manifolds, Groups and Singularities. A Conference in Honor of Walter Neumann, Columbia University, June 7-10, 2022

Special session on geometry of representation spaces, AMS joint mathematics meeting, Baltimore convention center, Baltimore, MD, January 19, 2019

Volume conjecture in Tokyo, University of Tokyo, Japan, August 22-24, 2018

Computational problems in low dimensional topology, Okinawa Institute of Science and Technology, Japan, March 12-14, 2018

Low dimensional topology and number theory, Oberwolfach, Germany, August 20-26, 2017

*Geometry of groups, surfaces and 3-manifolds*, AMS sectional meeting, Rutgers University, New Brunswick, NJ, November 14-15, 2015

Invariants in low dimensional geometry, Gazi University, Ankara, Turkey, August 10-14, 2015

 $New \ developments \ in \ TQFT,$  QGM, Aarhus University, Denmark, July 27-31, 2015

*Curve-2015*, Institut de Mathématiques de Jussieu, Paris, France, June 22-26, 2015

Dynamics on moduli spaces, MSRI, Berkeley, April 13-17, 2015

*Differential geometry and mathematical physics*, AMS sectional meeting, Dalhousie University, Nova Scotia, Canada, October 18-19, 2014

Low dimensional topology and number theory, Oberwolfach, Germany, August 17-23, 2014

 $GEAR\ junior\ retreat,$ University of Michigan, Ann Arbor, May<br/> 23 - June 1, 2014

Geometric topology in New York, Columbia University, New York, NY, August 12-16, 2013

Quantum topology and hyperbolic geometry, Nha Trang, Vietnam, May 13-17, 2013

Teichmüller theory: Quantization and relations with physics, ESI, Vienna, Austria, April 15-19, 2013

Algebraic and geometric structures on 3-manifolds, AMS sectional meeting, Boston College, Chestnut Hill, MA, April 6-7, 2013

Low dimensional topology and number theory, Oberwolfach, Germany, August 26 - September 1, 2012

Progress in low dimensional topology: Teichmüller theory and 3-manifold groups, QGM, Aarhus University, Denmark, August 11-14, 2012

Faces of geometry: 3-manifolds, groups and singularities, conference in honor of Walter Neumann, Columbia University, New York, NY, June 6-10, 2011

Ahlfors-Bers colloquium, Rice University, Houston, TX, March 24-27, 2011

Low dimensional topology and number theory, Oberwolfach, Germany, August 15-21, 2010

Quantum dilogarithm and quantum Teichmüller theory, Aarhus University, Denmark, August 9-13, 2010

Quantum geometry and topology, CIRM, Luminy, France, July 5-9, 2010

Special session on invariants of knots, links, and 3-manifolds, AMS sectional meeting, New Jersey Institute of Technology, Newark, NJ, May 22-23, 2010

Volume conjecture, invariants and geometry of knots, Waseda University, Tokyo, Japan, January 14-16, 2010, three lecture minicourse (see above)

Interactions between hyperbolic geometry, quantum topology and number theory, Columbia University, New York, NY, June 3-19, 2009

Low dimensional topology and number theory, BIRS, Banff, Canada, October 21-26, 2007

	$A\ second\ time\ around\ the\ volume\ conjecture,$ Louisiana State University, Baton Rouge, LA, May 30 - June 3, 2007
	Around the volume conjecture, Columbia University, New York, NY, March 13-19, 2006
	Mahler measure in Mobile, University of South Alabama, Mobile, AL, January 5-8, 2006
Invited Talks	Minicourses
	<i>Coordinates on representation varieties</i> , Korea Institute for Advanced Study, Seoul, Korea, August 22-26, 2016, three lectures
	Chern-Simons theory and representations of 3-manifold groups, University of Pittsburgh, PA, May 4-6, 2013, three lectures
	Triangulations, gluing equations and simplicial Chern-Simons theory, QGM, Aarhus University, Denmark, August 20-21, 2012, three lectures
	The extended Bloch group and representations of 3-manifold groups, Seoul Na- tional University, South Korea, October 7-9, 2010, three lectures each of two hours length
	The extended Bloch group and the Chern-Simons invariant, three lecture mini- course at the workshop Volume conjecture, invariants and geometry of knots, Waseda University, Tokyo, Japan, January 14-16, 2010
	Hyperbolic manifolds and $PSL(2, \mathbb{C})$ -representations, Seoul National University, South Korea, July 21-25, 2008, five lectures each of two hours length
Invited Talks	Colloquia
	Thurston's gluing equations for $\mathrm{PGL}(n,\mathbb{C}),$ Howard University, Washington, DC, November 9, 2012
	The volume and Chern-Simons invariant of a hyperbolic manifold, Boston College, MA, March 27, 2008
Invited Talks	Department seminars
	Copenhagen University, Denmark, March 22, 2022
	Copenhagen University, Denmark, March 17, 2022 (short intro)
	Florida State University, Fl, January 12, 2021

University of Maryland, College Park, MD, April 1, 2019 University of Maryland, College Park, MD, Feb 25, 2019 University of Maryland, College Park, MD, May 8, 2017 Copenhagen University, Denmark, July 12, 2016 Aarhus University, Denmark, June 27, 2016 Georgia Institute of Technology, Atlanta, GA, June 6, 2016 Columbia University, New York, NY, November 20, 2015 Georgia Institute of Technology, Atlanta, GA, October 26, 2015 George Mason University, Fairfax, Virginia, VA, October 9, 2015 Pohang University of Science and Technology, Pohang, Korea, September 21, 2015Stanford University, Palo Alto, November 14, 2014 University of Maryland, College Park, MD, October 27, 2014 Georgia Institute of Technology, Atlanta, GA, April 11, 2014 Institut de Mathématiques de Jussieu, Paris, France, January 8, 2014 Georgia Institute of Technology, Atlanta, GA, March 18, 2013 Rutgers University, New Brunswick, NJ, January 22, 2013 Columbia University, New York, NY, October 12, 2012 University of Maryland, College Park, MD, April 9, 2012 Copenhagen University, Denmark, March 20, 2012 Brown University, Providence, RI, February 29, 2012 Georgia Institute of Technology, Atlanta, GA, February 24, 2012 Cornell University, Ithaca, NY, October 18, 2011 University of Maryland, College Park, MD, October 3, 2011 University of Maryland, College Park, MD, September 26, 2011

University of California, Berkeley, CA, February 02, 2011 University of Maryland, College Park, MD, January 31, 2011 Boston College, MA, January 20, 2011 University of Texas, Austin, TX, December 7, 2010 University of California, Davis, CA, October 13, 2010 Waseda University, Tokyo, Japan, October 5, 2010 Stanford University, Palo Alto, CA, September 28, 2010 Copenhagen University, Denmark, July 20, 2010 Stanford University, Palo Alto, CA, October 6, 2009 Georgia Institute of Technology, Atlanta, GA, September 14, 2009 Aarhus University, Denmark, May 27, 2009 Max Planck Institute for Mathematics, Bonn, Germany, May 25, 2009 Copenhagen University, Denmark, May 11, 2009 University of California, Berkeley, CA, October 1, 2008 (two talks) Aarhus University, Denmark, May 13, 2008 Rutgers University, New Brunswick, NJ, March 11, 2008 Columbia University, New York, NY, February 22, 2008 Copenhagen University, Denmark, January 14, 2008 Georgia Institute of Technology, Atlanta, GA, February 19, 2007 Georgia Institute of Technology, Atlanta, GA, October 31, 2005 Columbia University, New York, NY, September 16, 2005 Aarhus University, Denmark, February 22, 2005 University of Maryland, College Park Spring 2024

• Field theory

TEACHING

EXPERIENCE

Fall 2023

- Introduction to abstract algebra
- Fundamental concepts of topology (graduate course)

Spring 2023

• Introduction to abstract algebra

Fall 2022

- Fundamental concepts of topology (graduate course)
- Introduction to abstract algebra

Spring 2022

• Sabbatical, no teaching

Fall 2021

- Introduction to topology
- Differential equations for scientists and engineers

### Spring 2021

- Algebraic Topology 2 (graduate course)
- Field theory

## Fall 2020

• Introduction to probability theory

### Spring 2020

- Algebraic structures
- Scissors congruence and spectral sequences (topics course)

#### Fall 2019

• Fundamental concepts of topology (graduate course)

#### Spring 2019

• Differential equations for scientists and engineers

Fall 2018

- Introduction to abstract algebra
- Differential equations for scientists and engineers

### Spring 2018

• Algebraic Topology 2 (graduate course)

### Fall 2017

- Scissors congruence and invariants of 3-manifolds (topics course)
- Introduction to probability theory

### Spring 2017

• Parental leave, no teaching

## Fall 2016

- Differential equations for scientists and engineers
- Introduction to topology

Spring 2016

• Scissors congruence, group homology and characteristic classes (topics course)

Fall 2015

- Fundamental concepts of topology (graduate course)
- Introduction to probability theory

Spring 2015

• Algebraic Topology 2 (graduate course)

Fall 2014

- Introduction to abstract algebra
- Differential equations for scientists and engineers

Spring 2014

• Field theory

### Fall 2013

- Differential equations for scientists and engineers
- Introduction to topology

### Spring 2013

• Introduction to probability theory

#### Fall 2012

• Fundamental concepts of topology (graduate course)

### Spring 2012

• Introduction to number theory

Fall 2011

• Introduction to number theory

## University of California, Berkeley

Spring 2011

- Elementary differential topology
- Second course in abstract algebra

### Fall 2010

• Algebraic topology (graduate course)

Spring 2010

- Introduction to abstract algebra
- Introduction to complex analysis

### Fall 2009

• Algebraic topology (graduate course)

### Fall 2008

- Linear algebra
- Algebraic topology (graduate course)

OTHERScissors congruence, group homology and characteristic classes, reading courseEDUCATIONALfor 2 graduate students, spring 2015SERVICEPolygons, polyhedra and scissors congruence, undergraduate seminar, Stanford<br/>University, November 13, 2014Teaching assistant for the minicourse "Invariants of Hyperbolic 3-Manifolds"<br/>given by Walter Neumann, Geometry and topology down under (workshop and<br/>conference in honor of Hyam Rubinstein), July 11-15, 2011Lecturer and teaching assistant in the spring school "Scissors congruences"<br/>for graduate students at the universities of Bonn, Bochum and Düsseldorf,<br/>Technische Universität Dortmund, Germany, May 1-4, 2009