

# Christian Krogager Zickert

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CONTACT INFORMATION Department of Mathematics +1 301-405-5072 (office)  
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College Park, MD, 20742, USA

PERSONAL INFORMATION Born October 30, 1980, in Struer, Denmark

RESEARCH INTERESTS My primary research interest is in low dimensional topology and its interactions with arithmetic and mathematical physics. I am particularly interested in representation varieties, scissors congruence, and Chern-Simons theory.

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 class*  
• Advisor: Walter D. Neumann

**Aarhus University, Denmark**  
M.S. in Mathematics, June 2005  
• Thesis title: *A dilogarithmic formula for the Cheeger-Chern-Simons class*  
• Advisor: Johan L. Dupont  
B.S. in Mathematics, June 2002  
• Thesis title: *The fundamental group and de Rham cohomology*  
• Advisor: Johan L. Dupont

AWARDS AND  
GRANTS

**NSF grant (PI)**, *Character varieties and cluster mutations*, DMS-1711405, 2017-2020

**NSF grant (PI)**, *Representations of 3-manifold groups*, DMS-1309088, 2013-2017

**NSF grant (PI)**, *The volume and Chern-Simons invariant in topology and number theory*, DMS-1007054 (DMS-1145374 after relocation), 2010-2013

**Rejselegat for Matematikere** (Traveling Scholarship for Mathematicians), full scholarship covering tuition, fees and living expenses, 2005-2008

PUBLICATIONS  
AND PREPRINTS

**C. Zickert**, *Fock-Goncharov coordinates for rank 2 Lie groups*, submitted, arXiv:1605.08297

**M. Goerner, C. Zickert**, *Triangulation independent Ptolemy varieties*, Math. Z. (2017), DOI:10.1007/s00209-017-1970-4, arXiv:1507.03238

**S. Garoufalidis, C. Zickert**, *The symplectic properties of the  $\mathrm{PGL}(n, \mathbb{C})$ -gluing equations*, Quantum Topol. 7 no. 3 (2016) 505–551, arXiv:1310.2497

**C. Zickert**, *Ptolemy coordinates, Dehn invariant, and the  $A$ -polynomial*, Math. Z. 283 (2016) 515-537, DOI:10.1007/s00209-015-1608-3

**S. Garoufalidis, D. Thurston, C. Zickert**, *The complex volume of  $\mathrm{SL}(n, \mathbb{C})$ -representations of 3-manifolds*, Duke Math. J. 164 no. 11 (2015) 2099–2160,

**S. Garoufalidis, M. Goerner, C. Zickert**, *Gluing equations for  $\mathrm{PGL}(n, \mathbb{C})$ -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

**C. Zickert**, *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

RESEARCH  
DIRECTION AND  
MENTORING

Advisor of Stephen Gilles, Laura Iosip, and Ryan Kirk, University of Maryland

Mentor for Zachary Greenberg, University of Maryland, since spring 2017

Masters exam advisor (non-thesis option) for Laura Iosip, University of Maryland, 2016

Mentor for Yousheng Shi, University of Maryland, fall 2014

*3-manifolds, triangulations and volume computations*, REU project for advanced undergraduates, summer 2014

Postdoctoral supervisor for Matthias Goerner, University of Maryland, spring 2012. Matthias is now a software developer at Pixar Animation Studios.

PROFESSIONAL  
SERVICE

PhD exam committee member for Robert Maschal, University of Maryland, 2017

PhD exam committee member for Jean-Philippe Burelle, University of Maryland, 2017

Preliminary PhD exam committee member for Corry Bedwell, University of Maryland, 2017

PhD exam committee member for Gregory Laun, University of Maryland, 2016,

Coorganizer of *Curve-2015*, conference on representations of 3-manifold groups, geometric structures and exact computations, Institut de Mathématique de Jussieu, Paris, France, June 22-26, 2015

NSF panel service, February, 2015

Merit pay committee member, University of Maryland, 2015

Preliminary PhD exam committee member for Tianyu Ma, University of Maryland, 2014

Policy committee member, University of Maryland, 2013-2014

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 (with Karin Melnick) of Geometry-Topology seminar, University of Maryland, 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  
TALKS

### **Minicourses**

*Coordinates on representation varieties*, 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 National 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 minicourse at the workshop *Volume conjecture, invariants and geometry of knots*, Waseda University, Tokyo, Japan, January 14-16, 2010

*Hyperbolic manifolds and  $\mathrm{PSL}(2, \mathbb{C})$ -representations*, Seoul National University, South Korea, July 21-25, 2008, five lectures each of two hours length

INVITED  
TALKS

**Conferences and workshops**

*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 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

### **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**

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, 2015

Stanford 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

TEACHING  
EXPERIENCE

**University of Maryland, College Park**

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)
- Scissors congruence, group homology and characteristic classes (reading 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)

OTHER  
EDUCATIONAL  
SERVICE

*Polygons, polyhedra and scissors congruence*, undergraduate seminar, Stanford University, November 13, 2014

Teaching assistant for the minicourse “*Invariants of Hyperbolic 3-Manifolds*” given by Walter Neumann, Geometry and topology down under (workshop and conference in honor of Hyam Rubinstein), July 11-15, 2011

Lecturer and teaching assistant in the spring school “*Scissors congruences*” for graduate students at the universities of Bonn, Bochum and Düsseldorf, Technische Universität Dortmund, Germany, May 1-4, 2009