Bjoern Muetzel

Eckerd College, Department of Mathematics
4200 54th Avenue S,St. Petersburg, FL 33711
☎ +1 727 864 8247
✉ bjorn.mutzel@gmail.com
http://natsci.eckerd.edu/∼muetzeb@campus

Personal data

Low dimensional geometry and topology, systolic geometry, harmonic forms on surfaces, Teichmüller space.

Education

2011 **EPF Lausanne**, *Switzerland*, PhD in Mathematics,
Title: *Capacities, systoles and Jacobians of Riemann surfaces.*
Thesis supervised by Peter Buser and Eran Makover.

2006 **University of Marburg**, *Germany*, Diplom in Mathematics,
Title: *Minimal period length of Abelian varieties.*

2003 **Max Planck Institute for Evolutionary Anthropology, Leipzig**, Diplom in Biology,
Title: *Functional profiling of gene expression in the human and chimpanzee brain.*

Employment

2020– **Eckerd College**, Assistant Professor

2015–2020 **Dartmouth College**, John Wesley Young Research Instructor, then Lecturer

Summer 2014 **Karlsruhe Institute of Technology**, Germany, Postdoctoral Fellow.

2011–2013 **University of Montpellier 2**, France, Postdoctoral Fellow.

2006–2011 **EPF Lausanne**, *Switzerland*, Teaching Assistant.

Honors and Awards

2020 **WISP and UGAR Grant**, Women in Science Project,
Linear Games - educational study.

2019 **VeChain Grant**, Neukom Institute, Co-PI,
$9000, Security of verifiable delay functions.

CompX Faculty Grant, Neukom Institute,
$8000, Linear Games - games based on algorithms from Linear Algebra.

2011–2013 **Feodor-Lynen Postdoctoral Fellowship**, Alexander von Humboldt Foundation,
$108 000, since January 2014 member of the Alexander von Humboldt network.

Publications (by date of completion)

Mathematics

[10] Buser P., Makover E., Muetzel B. and Silhol R.: *Energy distribution of harmonic 1-forms and Jacobians of Riemann surfaces with a short closed geodesic*, **54 pages**, to appear in Mathematische Zeitschrift (2020), https://doi.org/10.1007/s00209-020-02584-8.

[9] Gordon C., Webb D., Makover E. and Muetzel B.: *Transplantation and isogeny of intermediate Jacobians of compact Kähler manifolds*, Tohoku Math. Journal **72** (1) (2020), 127-147.

[8] Muetzel B.: *Length spectrum of geodesic loops in manifolds of non-positive curvature*, Journal of Geometry **109** (3), 43 (2018).

[7] Muetzel B.: *The Jacobian of a Riemann surface and the geometry of the cut locus of simple closed geodesics*, Ann. Acad. Sci. Fenn. Math. **42** (2017), 693-721.

[6] Akrout H. and Muetzel B.: *Construction of Riemann surfaces with large systoles*, Journal of Geometry **107** (2016), 187-205.

[5] Buser P., Makover E., Muetzel B. and Silhol R.: *Quasiconformal embeddings of Y-pieces*, Comput. Methods Funct. Theory **14** (2-3) (2014), 431-452.

[4] Massart D. and Muetzel B.: *On the intersection form of surfaces*, Manuscripta Mathematica **143** (1-2) (2014), 19-49.

[3] Muetzel B.: *Inequalities for the capacity of non-contractible annuli on cylinders of constant and variable negative curvature*, Geom. Dedicata **166** (1) (2013), 129-145.

[2] Muetzel B.: *A new lower bound for Hermite's constant for symplectic lattices*, Int. J. Number Theory **8** (4) (2012), 1067-1080.

[1] Muetzel B.: *On the second successive minimum of the Jacobian of a Riemann surface*, Geom. Dedicata **161** (1) (2012), 85-107.

in preparation

[3] Buser, P., Makover, E. and Muetzel B.: *Short homology basis for hyperelliptic hyperbolic surfaces*.

[2] Akrout H. and Muetzel B.: *Construction of surfaces with large systolic ratio*, (2019), arXiv 1311.1449.

[1] Herrlich, F., Muetzel B. and Schmithüsen G.: *Systolic geometry of translation surfaces*, (2018), arXiv:1809.10327.

Biology

[3] Prüfer K., Muetzel B. et al.: *FUNC: a package for detecting significant association between ontological annotation and genomic data*, BMC Bioinformatics **8** (41) (2007).

[2] Khaitovich P., Weiss G., Lachmann M., Hellmann I., Enard W., Muetzel B. et al.: *A neutral model of transcriptome evolution*, PLoS Biology **2** (5) (2004), e132.

[1] Khaitovich P., Muetzel B. et al.: *Regional patterns of gene expression in human and chimpanzee brains*, Genome Research **14** (8) (2004), 1462-73.

Undergraduate Research and Mentoring

2019– **Undergraduate research**,
Carlson C. and Lit A.: *Harmonic functions on a certain planar domain*, 62 pages.

2019– **Software project**,
Linear Games, developed with two teams of students from the DALI Lab and a single student, www.math.dartmouth.edu/lineargames.

2018– **Outreach in geometry**,
Engagement and mentoring of six students in a variety of outreach activities., http://natsci.eckerd.edu/∼muetzeb@campus/outreach.php.

2018– **Exchange program in statistics in Europe**,
Arranged and organized summer internships for in total eight students and helped them to obtain funding. The internships were conducted at the following institutes:
- **INRA** Biostatistics and Spatial Processes, Avignon, *2019/20*.
- **British Antarctic Survey**, Cambridge, *2019*.
- **Wenner Gren Institute**, Department of Molecular Biosciences, Stockholm, *2019*.
- **Max Planck Institute** for Evolutionary Anthropology, Leipzig, *2018*.

Broader Impact

2019– **Math and Art**,
Exhibition of mirror Archimedean solids - photos and sculptures,
- **JMM Art Exhibition**, Joint Mathematics Meetings 2020, Denver, Colorado, *Jan 2020*
- ICERM, Brown University - Illustrating Mathematics Program, *Sept - Dec 2019*, www.math.dartmouth.edu/∼mutzel/gallery.php.

2018– **Outreach - Geometry activities for children**,
- Hanover High School, *January 2020*
- NYC Math Festival, New York, *Aug 2019*
- **National Math Festival**, Washington, *May 2019*
- Crossroads Academy, Canaan Elementary School, *May 2019*
- **MoMath Family Night** in New York, BNL program in Long Island, *Dec 2018*
- Marion Cross School, Lyme School, *Sept 2018*
- Mount Lebanon School, Hanover Street School, Ray School, *May - June 2018*

Selected Presentations

2019 -*Energy distribution of harmonic 1-forms on Riemann surfaces with a short closed geodesic*, CUNY Graduate Center, New York.
-*Build your own polyhedra*, Sonia Kovalevsky Day, Dartmouth College, Hanover.
-*Platonic and Archimedean Solids*, Dartmouth Math Society, Dartmouth College, Hanover.
-*Energy distribution of harmonic 1-forms on Riemann surfaces with a short closed geodesic*, Universidad de los Andes, Bogota, Colombia.

2018 - *Harmonic forms on surfaces - a visual approach*, Math Table, Harvard University, Boston.
-*The Jacobian variety of Riemann surfaces with short simple closed geodesics*, geometry seminar, Humboldt University, Berlin, *Germany*.
-*Collars, capacities and Uniformization of surfaces*, geometry seminar, Karlsruhe Institute for Technology, *Germany*.
-*The Jacobian variety of Riemann surfaces with short simple closed geodesics*, Session on Differential Geometry, JMM 2018, San Diego.

2016 -*The Jacobian of Riemann surfaces with short simple closed geodesics*, VI Workshop on Differential Geometry, Cordoba, *Argentina*.

2015 -*The Jacobian of a Riemann surface and the geometry of the cut locus of simple closed geodesics*, geometry seminar, Dartmouth College.
-*Construction of Riemann surfaces with large systoles*, geometry seminar, Dartmouth College.

2013 -*Construction of Riemann surfaces with large systoles*, differential geometry seminar, University of Freiburg, *Germany*.
-*Construction of Riemann surfaces with large systoles*, Mathematical Colloquium, Karlsruhe Institute for Technology, *Germany*.

2012 -*Length spectrum of geodesic loops in manifolds of non-positive curvature*, seminar Gaston Darboux, University of Montpellier 2, *France*.
-*Construction of surfaces with large systolic ratio*, differential geometry seminar, Max Planck Institute for Mathematics, Bonn, *Germany*.

Teaching

Lecturer

2020 Ma131M: Calculus, *Fall*.
Ma233M: Calculus of vector valued functions, *Fall*.
Math 10: Statistics, *Spring*.
Math 13: Calculus of vector valued functions, *Winter*.

2019 Math 22: Linear algebra with applications, *Fall, Spring*.
Math 8: Calculus in one and several variables, *Winter*.

2018 Math 103: Measure theory and complex analysis, *Fall*.
Math 31: Abstract algebra, *Fall*.
Math 8: Calculus in one and several variables, *Spring*.
Math 35: Real analysis, *Winter*.

2017 Math 31: Abstract algebra, *Fall*.
Math 8: Calculus in one and several variables, *Spring*.
Math 13: Calculus of vector valued functions, *Winter*.

2016 Math 31: Abstract algebra, *Fall*.
Math 22: Linear algebra with applications, *Spring*.
Math 3: Calculus, *Winter*.

2015 Math 112: Geometric group theory, *Fall*.

Teaching Assistant

2014 Geometric group theory, *Summer*.

2006–2011 Calculus I and II for engineers.
Design and coding of online exercises for the courses in calculus and geometry.

2008-2009 Geometry for engineers, *Spring*.

Department service

2018– **Co-organizer** and contributor to the course repository, Dartmouth College.

2017– **Co-organizer** of the geometry seminar, Dartmouth College.

2016– **Judge** for the poster session in applied and pure mathematics, Dartmouth College.

2010 **Organization** of the seminar '*Compact Riemann surfaces*', EPF Lausanne.

Scholarly activities

2018– **Reviewer** for 'Complex Variables and Elliptic Equations'.

2017– **Panelist** for the Young Mathematicians Conference (Ohio State).

2014– **Reviewer** for Mathematical Reviews and zbMATH.

Languages

German - *mother tongue*, English - *fluent*, French - *very good*, Spanish - *good*, Latin - *good*, Russian - *beginner*.

References

Teaching

John Voight, Dartmouth College, Hanover, *USA*
David Webb, Dartmouth College, Hanover, *USA*

Research

Peter Buser, EPF Lausanne, *Switzerland*
Carolyn Gordon, Dartmouth College, Hanover, *USA*
Frank Herrlich, Karlsruhe Institute of Technology, *Germany*
Robert Silhol, University of Montpellier 2, *France*