

RESEARCH INTERESTS

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

- 2015– **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

- [11] 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*, **56 pages**, submitted (2019), arXiv:1810.05259.
- [10] Akrouf H. and Muetzel B.: *Construction of surfaces with large systolic ratio*, submitted (2019), arXiv 1311.1449.

- [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] Akrouit 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

- [2] Muetzel B.: *Extremal length of collars and uniformization of surfaces*.
- [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 a team of students from the DALI Lab,
www.math.dartmouth.edu/lineargames.
- 2018– **Outreach in geometry**,
Engagement and mentoring of six students in a variety of outreach activities.,
www.math.dartmouth.edu/~muetzel/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 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.

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*