

RESEARCH INTERESTS

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

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

EMPLOYMENT

- 2015– **Dartmouth College**, Lecturer, before John Wesley Young Research Instructor,
with Carolyn Gordon and David Webb.
- Summer 2014 **Karlsruhe Institute of Technology, Germany**, Postdoctoral Fellow,
with Frank Herrlich and Gabriela Weitze-Schmithüsen.
- 2011–2013 **University of Montpellier 2, France**, Postdoctoral Fellow,
with Robert Silhol.
- 2006–2011 **EPF Lausanne, Switzerland**, Teaching Assistant.

HONORS AND AWARDS

- 2011–2013 **Feodor-Lynen Postdoctoral Fellowship of the Alexander von Humboldt Foundation**,
\$108 000, since January 2014 member of the Alexander von Humboldt network.
- 2019 **CompX Faculty Grant, Neukom Institute, Dartmouth College**,
\$8000, Linear Games - games based on algorithms from Linear Algebra.

PUBLICATIONS (by date of completion)

Mathematics

- [10] Gordon C., Webb D., Makover E. and Muetzel B.: *Transplantation and isogeny of intermediate Jacobians of compact Kähler manifolds*, to appear in *Tohoku Math J* (2018), arXiv:1804.00031.
- [9] Akrouf H. and Muetzel B.: *Construction of surfaces with large systolic ratio*, submitted (2018), arXiv 1311.1449.

- [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.: *Capacities 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] Muetzel B.: *Extremal length of collars and uniformization of surfaces*.
- [2] 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*, (2018) arXiv:1810.05259.
- [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.

OUTREACH

- 2018– **Organization of geometry exhibitions**,
 - Mount Lebanon School, Hanover Street School, Ray School *May - June 2018*
 - Marion Cross School, Lyme School, *September 2018*
 - MoMath Family Night in New York, BNL program in Long Island, *December 2018*

MENTORING AND UNDERGRADUATE RESEARCH

- 2019– **Numerical approximations of harmonic forms on surfaces**,
 - *Harmonic functions on a certain planar domain, (62 pages)*. Undergraduate research project.
- 2018– **Supervision of a poster for the geometry exhibition**,
 - *Pentagonal tilings*.

- 2018– **Organization of exchanges in statistics in Europe**,
Max-Planck Institute for Evolutionary Anthropology: Internship for three Byrne scholars,
June - August 2018.

PRESENTATIONS

- 2018 - *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.*
- 2011 - *The Jacobian of a Riemann surface and the geometry of the cut locus of simple closed geodesics*, ergodic and geometric group theory seminar, EPF Lausanne, *Switzerland.*
- 2009 - *On the second successive minimum of the Jacobian of a Riemann surface*, NSF CBMS conference on Weil-Petersson geometry, Central Connecticut State University.

EXCHANGES AND PROJECTS

- 2004 **Lomonosov Moscow State University**, Moscow, *Russia.* Inter-university exchange program. Russian courses and seminar in real analysis.
- 2001 **Memorial Sloan Kettering Cancer Center**, New York, *USA.* Project in biostatistics and mathematical genetics.
- 2000/2001 **University of Paris-Sud**, Orsay, *France.* Erasmus exchange program in biology. Studies in neurobiology and bioinformatics.
- 2000 **Polytechnic University of Catalonia**, Barcelona, *Spain.* Erasmus exchange program in mathematics. Studies in real analysis and calculability.

LANGUAGES

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

TEACHING

Lecturer

- 2018 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.

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*