

Ferrán Valdez

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Research Interests

I'm interested in low-dimensional topology, geometry and dynamics. More precisely the study of billiards, flat surfaces, and hyperbolic 3-manifolds. I pay special attention to surfaces whose fundamental group is not finitely-generated. On the other hand, I'm interested in geometric group theory: in particular in the study of mapping class groups. Last but not least, I've studied holomorphic foliations and maps (in combinatorics).

Education

Ph.D. Université de Rennes 1, 2007.
Feuilletages homogènes et billards polygonaux. Supervised by D. Cerveau.

D.E.A. Université de Rennes 1, 2004.
Classification topologique des feuilletages de dimension et codimension 1 sur \mathbb{C}^n et $\mathbb{C}P(n)$ définis par des E.D.O. linéaires. Supervised by D. Cerveau.

Undergraduate studies at Universidad Nacional Autónoma de México. 1998-2003

Human languages: Spanish (native), English, French and German.

Experience

Professor, Centro de Ciencias Matemáticas, UNAM Campus Morelia. 2015-current.

Associate Professor, Centro de Ciencias Matemáticas, UNAM Campus Morelia. 2013-2015.

Assistant Professor, Centro de Ciencias Matemáticas, UNAM Campus Morelia. 2009-2013.

Postdoctoral Fellow (SFB of the Deutsche Forschungsgemeinschaft) at Max-Planck Institut für Mathematik, Bonn. 2007-2009. Supervised by Martin Möller

Visiting professor at: MPIM (Bonn), Hausdorff Research Institute for Mathematics (Bonn), Karlsruhe Institute for Technology, Centre de Physique Théorique (Luminy), Institut Fourier (Grenoble), CUNY Graduate center (New York), IMERL (Uruguay), Université Aix-Marseille, Universidad Andrés Bello (Chile), CMM (Chile), Fundación Konrad Lorenz (Colombia), Universidad de San Carlos (Guatemala), Tel Aviv University, LaBRI (Bordeaux).

Publications

1. Billiard in a triangle and quadratic homogeneous foliations on \mathbb{C}^2 . *C. R. Math. Acad. Sci. Paris, SerI* I. 346 :317-322, 2008
2. Billiards in polygons and homogeneous foliations on \mathbb{C}^2 . *Ergodic Theory Dynam. Systems* 29 (2009), no. 1, 255–271.
3. Infinite genus surfaces and irrational polygonal billiards. *Geometria Dedicata*. Volume 143, Number 1 (2009), 143-154.
4. Veech groups of Loch Ness Monsters. With P. Przytycki & G. Schmithuesen. *Annales de l'institut Fourier*, 61 no. 2 (2011), p. 673-687
5. Veech groups, irrational billiards and stable abelian differentials. *Discrete and Continuous Dynamical Systems, series A*. Volume 32, Number 3, March 2012. p. 1055-1063.
6. Wild singularities of flat surfaces. With Joshua Bowman. *Israel J. Math.* 197 (2013), no. 1, 6–97.
7. On the geometry and arithmetic of infinite translation surfaces. With G. Schmithuesen, *J. Singul.* 9 (2014), 226–244.
8. The topology of the minimal cover of Archimidean tessellations. With T. Coulbois, D. Pellicer, M. Raggi y C. Ramírez. *Adv. Geom.* 15 (2015), no. 1, 77–91.
9. Automorphism groups of simplicial complexes of infinite type surfaces. With Jesús Hernández. *Publ. Mat.* 61 (2017), no. 1, 51-82.
10. Computing the Teichmüller polynomial. With Erwan Lanneau. *J. Eur. Math. Soc. (JEMS)* 19, No. 12, 3867-3910 (2017)
11. On the topology of infinite regular and chiral maps. With John A. Arredondo & Camilo Ramirez. *Discrete Math.* 340 (2017), no. 6, 1180-1186.
12. Veech groups of infinite genus surfaces. With Camilo Ramirez. *Algebr. Geom. Topol.* 17 (2017), no. 1, 529-560
13. On the geometry of graphs associated to infinite type surfaces. With Javier Aramayona. *Math. Z.* 289, No. 1-2, 309-322 (2018).
14. Isomorphisms between curve graphs of infinite-type surfaces are geometric. With Jesús Hernández Hernández & Israel Morales. *Rocky Mt. J. Math.* 48, No. 6, 1887-1904 (2018).
15. The Alexander method for infinite-type surfaces. With Jesús Hernández & Israel Morales. *Mich. Math. J.* 68, No. 4, 743-753 (2019).
16. Loxodromic elements in big mapping class groups via the Hooper-Thurston-Veech construction. With Israel Morales. arXiv:2003.00102, *To appear in: Algebr. Geom. Topol.*
17. Conjugacy classes of big mapping class groups. With Jesús Hernández, Michael Michael Hrušák, Israel Morales, Anja Randecker & Manuel Sedano. arXiv:2105.11282, *To appear in: J. Lond. Math. Soc.*

Expository & Conference proceedings

1. *Wild Singularities of translation surfaces*. Billiards, Flat Surfaces, and Dynamics on Moduli Spaces. Oberwolfach Report No. 25/2011. p. 1416-1418.
2. *Billares poligonales y curvas de Teichmüller I*¹. **universo.math** (ISSN 2007-9141), vol. 1 no. 2, 2014.

¹Expository paper

3. *Veech groups of infinite type surfaces*. With Camilo Ramírez Maluendas.
4. *Billares poligonales y curvas de Teichmüller II*². **universo.math** (ISSN 2007-9141), vol. 2 no. 1, 2015.

Awards, honors and professional activities

- Elected member of TWAS (july 2017)
- Member of *Unité Mixte Internationale LaSol*, 2017-current.
- EMALCA Scientific Committee Member. 2016-present.

Grants

- Guest Program, Max-Planck Institut für Mathematik 2018-2019 (Germany).
- Ciencia Básica CONACYT 2018-2021 (Mexico).
- PAPIIT IN102018, 2018-2021 (Mexico).
- PAPIIT IN100115, 2015-2016 (Mexico).
- NANUM Travel Grant Program (Republic of Korea)
- PAPIIT IB00212, 2012-2014 (Mexico).
- Ciencia Básica CONACYT 2008-2011(Mexico).

Advising

- Manuel Sedano. Postdoctoral fellow, 2020-present.
- Jesús Hernández, Postdoctoral fellow, 2016-2017. *Currently Assistant Professor at Universidad Nacional Autónoma de México.*
- Rogelio Niño, Ph.D. Student 2020-present. Co-direction with Carlos Matheus.
- Israel Morales, Ph.D. Student, 2015-2020. *Currently Postdoc at Universidad Nacional Autónoma de México, Campus Oaxaca.*
- Camilo Ramírez, Ph.D. Student, 2011-2015. *Currently Assistant Professor at Universidad Nacional de Colombia.*

- Israel Morales, M. Sc. student, 2015.
- Miguel Ángel Mendez, M. Sc. student, 2014
- Alejandro Apaza, M. Sc. student, 2013.

²Expository paper

Selected talks in conferences, workshops and special events

- Mapping class groups grandes (plenary speaker). Joint meeting of the SMM and the RSME 2021.
- AIM Workshop on infinite type surfaces, San José, USA, 2019.
- First joint meeting Colombia-Mexico (plenary speaker), Barranquilla, Colombia 2018.
- Third PRIMA Congress, Oaxaca, 2017
- Congreso de inauguración de la UMI-LaSol, Cuernavaca, México, 2017.
- V Congreso Latinoamericano de Matemáticas, Barranquilla, Colombia 2016.
- First joint meeting Israel-Mexico, Oaxaca, 2015.
- Dynamique à Porquerolles, Porquerolles, France, 2015.
- EDAI 50, Rio de Janeiro, 2014.
- Dynamics and Numbers, MPIM, Bonn, 2014.
- Flat Surfaces and Dynamics on Moduli Space, Oberwolfach, 2014.
- Mathematical Congress of the Americas, Guanajuato, 2013.
- ICTG 2013-JAMEX, Matsue, Japan, 2013.
- Dynamics on parameter spaces, Sde Boker, Israel 2013.
- IV Congreso Latinoamericano de Matemáticos, Córdoba, 2012.
- Holomorphic foliations and complex dynamics. Lab. Poncelet, Moscow. 2012.
- Karlsruher Weih- nachtsworkshop on Geometry and Number Theory. KIT, Karlsruhe, 2011.
- Algebraic Methods in Geometry: Commutative and Homological Algebra in Foliations and Singularities. CIMAT Guanajuato, 2011.
- Billiards, Flat Surfaces, and Dynamics on Moduli Spaces. Oberwolfach, 2011
- International Conference Japan-Mexico on Topology and its applications, Colima. 2010
- VII joint meeting SMM-AMS, Berkeley. 2010
- Dynamique et feuilletages complexes: quelques exemples. Orsay, 2008
- Dynamique de l'espace de Teichmueller. Roscoff, France 2008.
- Postdoc Spring School: Field Theory, String Theory and Gromov-Witten Invariants. MPIM, Bonn, 2008.

Selected talks in seminars

- Virtual thematic Workshop in Math Sciences. TWAS-TYAN, the internet, 2020.
- Oberseminar, MPIM, Bonn, Germany 2019
- Oberseminar Differentialgeometrie MPIM, Bonn, Germany 2018
- Séminaire Géométrie et groupes discrets, IHES, France 2018.
- Degustaciones matemáticas, UMSNH, Morelia, 2017.

Action Now Wandering Seminar, Tel Aviv University, 2016
 DINAL, UNAM Cuernavaca, 2015.
 Complex Geometry Seminar. Graduate Center, CUNY, New York 2014.
 Seminario de matemáticas. Universidad Andrés Bello, Santiago de Chile. 2014
 Differential Geometry Seminar. CIMAT, Guanajuato 2013.
 Seminario de Sistemas Dinámicos, IMERL, Uruguay, 2012.
 Geometry Seminar. Florida State University. 2011
 Geometric Group Theory seminar. KIT, Karlsruhe, 2010
 Geometric Group Theory seminar. KIT, Karlsruhe, 2009
 Séminaire de géométrie analytique. IRMAR, Rennes. 2008
 MPIM, Oberseminar. 2007
 Laboratoire Émile Picard, Toulouse, Séminaire des équations différentielles et systèmes intégrables. 2006
 IML, Luminy. Séminaire de Dynamique, Arithmétique et Combinatoire, 2006

Outreach

Cofounder of ClubMate³
 Participant of Feria Matemática de Morelia in 2012, 2016 & 2017.

Conference organization

Escuela de Verano en Matemáticas, Morelia, 2010.
 XLV Congreso Nacional, Mexican Mathematical Society. Querétaro, México. 2012.
 International Conference and Workshop on Surfaces of Infinite Type. Morelia, México 2013.
 Primer Encuentro de Estudiantes de Posgrado. Cuernavaca, México, 2014.
 Encuentro de Rigidez Algebríaca y combinatoria para grupos modulares, Morelia, México, 2015.
 Flat Surfaces and Dynamics on Moduli Space, BIRS-CMO, Oaxaca, 2016.
 Sage Days 73, Oaxaca, 2016.
 XLIX Congreso Nacional, Mexican Mathematical Society. Aguascalientes, México. 2016.
 Taller Propedéutico de ingreso al Posgrado. Morelia, 2017.
 50 Congreso Nacional. Mexican Mathematical Society. CDMX. 2016.
 Sage days 92 & Software Tools for Mathematics, Morelia, 2018
 Flat Surfaces and Dynamics on Moduli Space II, BIRS-CMO, Oaxaca, 2019.

³See <http://www.matmor.unam.mx/clubmate/>

Referreing and reviewing

Ergodic Theory and Dynamical Systems, Pacific Journal of Mathematics, Tokyo Journal of Mathematics, Conformal Geometry and Dynamics, Annales de l'Institut Fourier, Bulletin of the AMS, American Mathematical Monthly, Bulletin SMM, Proceedings AMS, Topology and its Applications.

References

Pascal Hubert. CMI, Marseille, France.

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Martin Möller. Goethe Universität, Frankfurt am Main, Germany.

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