

Dr. LUIS G. VALDEZ-SANCHEZ

Associate Professor

Department of Mathematical Sciences

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EDUCATION

1995 *University of California at Berkeley, CA*
Ph.D. Mathematics
1993 M.A. Mathematics

1987 *University of Texas at El Paso, TX*
B.S. (Honors) Mathematics, minor in Physics

AREAS OF INTEREST

Low Dimensional Topology, Knot Theory, Geometric Algebra.

PUBLICATIONS

- L. G. Valdez-Sanchez: *Dehn fillings of 3-manifolds and non-persistent tori.*
Topology and its Applications vol. 98, (1999), pp. 355–370
- A. Khamsi, N. Nguyen, and L. G. Valdez-Sanchez: *The AR Property in Linear Metric Spaces.*
Topology and its Applications vol. 109, (2001), pp. 267–284.
- L. G. Valdez-Sanchez: *Essential arcbody and tangle decompositions of knots and links.*
Journal of Knot Theory and its Ramifications, vol. 8, (1999), pp. 1065–1085
- L. G. Valdez-Sanchez: *Representation of Types and 3-Manifolds.*
Pacific Journal of Mathematics vol. 210, (2003), pp. 367–397.
- L. G. Valdez-Sanchez: *Seifert Klein bottles for knots with common boundary slopes.*
Geometry and Topology Monographs, vol. 7, (2004), pp. 27–68;
Proceedings of the Casson Fest
- L. G. Valdez-Sanchez: *Once-punctured Klein bottles in knot complements.*
Joint work E. Ramirez (CIMAT, Gto, Mexico),
Topology and its Applications vols. 146-147, 2005, pp.159–188.

L. G. Valdez-Sanchez and Enrique Ramirez-Losada: *Crosscap number two knots in the 3-sphere with (1,1) decompositions.*

Boletín de la Soc. Mat. Mex., 3rd series, vol. 10, (2004), Special Issue

L. G. Valdez-Sanchez: *Toroidal and Klein bottle boundary slopes.*

Topology and its Applications vol. 154, (2007), pp. 584–603

L. G. Valdez-Sanchez and Enrique Ramirez-Losada: *Hyperbolic (1,2) knots in S^3 with crosscap number two and tunnel number one.*

Topology and its Applications vol. 156, (2009), no. 8, 1463–1481.

L. G. Valdez-Sanchez: *Corrigendum to “Toroidal and Klein bottle boundary slopes”.*

Topology and its Applications vol. 160, (2013), no. 3, 575–588.

PREPRINTS

L. G. Valdez-Sanchez: *Toroidal Dehn fillings at distance 3.*

In preparation.

CONFERENCES AND INVITED LECTURES

Underrepresented Students in Topology and Algebra Research Symposium

University of California at Berkeley; April 4–5, 2014

Title of Invited Talk: *A bound for the number of disjoint genus one surfaces bounded by a hyperbolic knot in the 3-sphere*

2nd School of knot theory and 3-manifolds

CIMAT (Centro de Investigación en Matemáticas); Guanajuato, Mexico; Dec 9–12, 2013

Invited 4-day mini-course speaker; title of course:

Incompressible and boundary incompressible surfaces in knot exteriors in the 3-sphere

School of knot theory and 3-manifolds, to celebrate the 70th birthday of Fico Gonzalez-Acuna.

CIMAT (Centro de Investigación en Matemáticas); Guanajuato, Mexico; Dec 17–20, 2012

Invited Speaker. Titles of Invited Talks:

Dec 17: *Reducible Dehn fillings of hyperbolic 3-manifolds*

Dec 18: *Toroidal Dehn fillings of hyperbolic 3-manifolds*

46th Spring Topology and Dynamics Conference; Mexico City, Mexico.

Universidad Nacional Autónoma de México; March 22–24, 2012

Title of Invited Talk:

A correction to a bound for families of parallel negative edges in torus graphs.

Underrepresented Students in Topology and Algebra Research Symposium

University of Iowa, Iowa; April 1st - 3rd, 2011

Title of Invited Talk: *Toroidal Dehn fillings of hyperbolic 3-manifolds*

5th International Conference Japan-Mexico on Topology and its Applications

September 27–October 1, 2010, Colima, Mexico.

Conference Main Speaker

Title of invited talk: *Dehn fillings of hyperbolic 3-manifolds*

Jornadas de Fisica y Matematicas, Universidad Autonoma de Cd. Juarez

April 20–24, 2009; Cd. Juarez, Mexico

Invited talk: *Handlebodies and presentations of groups*

VII Joint American Mathematical Society-Sociedad Matematica Mexicana Meeting

May 23–26, 2007

Special Session in Low Dimensional Topology

Title of invited talk: *Some toroidal Dehn fillings at distance 3*

Universidad Autonoma de Zacatecas, in Zacatecas, Mexico

3-manifolds and knot theory (in honour of the 60th birthday of Cameron Gordon)

May 23–25, 2005, Austin, TX.

3rd Japan-Mexico Joint Meeting on Topology and its Applications

December 6–10, 2004, Oaxaca, Mexico.

Special Session in Knot Theory

Title of invited talk: *Crosscap 2, tunnel 1 knots in the 3-sphere without (1,1) decompositions*

VI Joint AMS-SMM Meeting

Houston, TX, May 13–15, 2004

Special Session in Low Dimensional Topology

Title of invited talk: *Seifert Klein bottles for knots in the 3-sphere*

Topology of Manifolds of Dimensions 3 and 4

University of Texas at Austin; May 19-21 2003.

28th Annual University of Arkansas Spring Lecture Series in the Mathematical Sciences

University of Arkansas; April 10–12, 2003.

Hiroshima University Hiroshima, Japan

March 15–29, 2003

Two weeks visit with Masakazu Teragaito

FicoFest

Merida, Yucatan, Mexico, Dec 6–15, 2002.

Title of invited talk: *Seifert Klein bottles in knot complements*

FicoFest

Merida, Yucatan, Mexico, Dec 6–15, 2002.

Title of invited workshop: *Dehn surgery on knots and links in the 3-sphere.*

Topology in Matsue

Matsue, Japan, June 24–28, 2002

Title of invited talk: *Klein bottles in knot complements*

CIMAT Colloquium

Guanajuato, Mexico, February 2002

Title of invited talk: *Surgery on knots in S^3 .*

Topology Seminar; University of Texas at Austin, April 17–19, 2001

Title of invited talk: *Connected planar graphs of intersection and knots in S^3 with exceptional surgeries.*

Mathematics Department Colloquium – Rice University

February 15, 2001. Houston, TX

Title of invited talk: *Surgery on knots in S^3 .*

VI Semana de Ingenieria, Universidad Autonoma de Cd. Juarez

Sep 22–24, 2000; Cd. Juarez, Mexico

Invited talk: *Hyperbolas, Triangles, and Convex Geometry*

Three lectures in Knot Theory

CIMAT (Center for Mathematics Research), Guanajuato, Mexico

Invited lectures; Nov 22–26, 1999

1999 Fall Central Sectional Meeting

Oct 8–10; Austin, TX

Special session in *Dehn surgery and Kleinian groups*

Mathematics Department Colloquium - New Mexico State University

Oct 7, 1999; Las Cruces, NM

Invited Talk: *Surgery on knots and links in S^3*

V Semana de Ingenieria, Universidad Autonoma de Cd. Juarez

Sep 22–24, 1999; Cd. Juarez, Mexico

Invited talk: *Invariants of knots and links and their applications*

First Japan-Mexico Joint Meeting in Topology and its Applications

July 7–10, 1999; Morelia, Mich, Mexico

Title of Talk: *Essential arcbody and tangle decompositions of knots*

IV AMS-SMM International Joint Meeting; May 19–22, 1999; Denton, TX

Co-organizer of the *Special session in Low Dimensional Topology*

Title of Talk: *Essential tangle decompositions of knots and the Cabling Conjecture*

Topology Seminar, UT Austin

February 22–23, 1999

Title of Talk: *Essential tangle decompositions of knots without parallel strings*

Science and Technology Week (SOMPROCYT, UACJ)

April 20–24, 1998

Title of Talk: *A short history of some modern mathematics*

III AMS-SMM Joint Meeting

Oaxaca, Mexico; Dec 3–6 1997

Special session on Low Dimensional Topology;

Title of Talk: *Knots in S^3 with strong tangle decompositions and a reducible surgery are cabled.*

III Semana de Ingenieria; Universidad Autonoma de Cd. Juarez

Cd. Juarez, Mexico; Nov 3–7 1997

Invited talk: *Maps, Combs, and Ham Sandwiches: topology and reality.*

1997 SACNAS National Conference

Houston, Texas, Oct 9–12

Special Session in Mathematics

Title of Talk: *Generalized tangle decompositions of knots*

II Iberoamerican Congress on Topology and its Applications

Morelia, Michoacan; Mexico; March 20–22, 1997.

Special Session on Low Dimensional Topology

Title of Talk: *On Reducible Dehn Surgery*

Astronomy and Mathematics Week

Cd. Juarez, Chih., Mexico; April 7–11, 1997

Title of Talk: *Algebraic Topology: Surfaces, Coverings, and Complex Analysis*

909th AMS Meeting at the University of Iowa

Iowa City, Iowa; March 22–23, 1996.

Special Session on Topology of 3-Manifolds.

New Mexico Geometry and Topology Conference

New Mexico State University, Las Cruces, NM; April 12–13, 1996;

Invited speaker address: *Cable Knots and Reducible Surgeries*

VI Regional Week on Research and Teaching of Mathematics

Hermosillo, Sonora; Dec 11–15, 1995.

Title of Talks: *5 Lectures on the applications of intersection of surfaces to 3-manifold topology.*

II AMS-SMM Joint Meeting; Guanajuato, Mexico; Nov 29–Dec 2 1995

Special session on Low Dimensional Topology;

Title of Talk: *On manifolds obtained from generalized Scharlemann cycles.*

Fall Texas Geometry and Topology Conference
University of Texas, Austin, TX;
Nov 10–12, 1995

New Mexico Geometry and Topology Conference
University of New Mexico, Albuquerque, NM;
Oct 27–29, 1995

INVITED SEMINARS AND COLLOQUIA

New Mexico State University (NMSU) Department of Mathematical Sciences
Las Cruces, NM; October 27, 2010
Title of Topology Seminar Talk: *Constructing hyperbolic 3-manifolds with toroidal Dehn fillings.*

New Mexico State University (NMSU) Department of Mathematical Sciences
Las Cruces, NM; November 15, 2007
Title of Colloquium Talk: *Toroidal Dehn Fillings of Hyperbolic 3-Manifolds: $\Delta = 3$.*

University of Texas at El Paso (UTEP) Department of Mathematical Sciences
September 28, 2007.
Title of talk: *Some applications of low dimensional topology to algebra.*

University of Texas at El Paso, Math Dept
September 15, 2006.
Title of talk: *Toroidal Dehn fillings of hyperbolic 3-manifolds*

Universidad de Colima, Math Dept
May 4, 2005, Colima, Mexico.
Title of invited talk: *Hyperbolic knots with toroidal surgeries*

University of Texas at El Paso, Math Dept
January 28, 2005.
Title of talk: *Tunnel number one hyperbolic knots without $(1,1)$ structures*

CIMAT Mathematics Colloquium, April 3, 2002
CIMAT (Center for Mathematics Research), Guanajuato, Mexico
Title of Talk: *Knots in the 3-sphere and reducible surgery*

UTEP Mathematics Department Seminar, Oct 8, 1998
Title of Talk: *Essential arcbody and tangle decompositions*

CIMAT Topology Seminar, Aug 7–9 and Aug 14–16
CIMAT (Center for Mathematics Research), Guanajuato, Mexico
Title of Talk: *Essential tori form inessential Klein bottles*

General and Low dimensional Topology Seminar

Universidad Autonoma de Zacatecas, Aug 3 – Aug 21, 1998

Three week intensive topology seminar for advanced undergraduate and graduate mathematics students

NMSU Mathematics Department Basic Notions Seminar

Las Cruces, NM; March 27, 1998

Title of Talk: *Knots in the 3-sphere, and why we can not construct a closed tin can out of a Moebius band*

NMSU Mathematics Department Topology Seminar

Las Cruces, NM; Feb 6, 1998

Title of Talk: *Strong tangle decompositions of knots in the 3-sphere*

UTEP Mathematics Department Seminar, Oct 30, 1997

Title of Talk: *Strong generalized tangle decompositions of knots*

NMSU Mathematics Department Topology Seminar

Las Cruces, NM; Feb 21, 1997

Title of Talk: *The geometry and algebra of representation of types.*

New Mexico Geometry and Topology Seminar

New Mexico State University, Las Cruces, NM; Feb 19 & 26, 1997;

Title of Talk: *On T-Manifolds*

NMSU Mathematics Department Topology Seminar

Las Cruces, NM; Feb 21, 1996

Title of Talk: *Reducible Dehn Surgeries.*

UTEP Mathematics Department Seminar, Jan 31, Feb 7 1996

Title of Talks: *Representation of Types and 3-Manifold Topology.*

AWARDS AND GRANTS

- 2002–2005 Research grant, CONACyT (Mexico)
Co-Pi of the Low Dimensional Topology Group in CIMAT, Gto, Mexico.
- 1991–1992 *The Outstanding Graduate Student Instructor Award and Citation*
University of California at Berkeley, Department of Mathematics
- 1984 *45th William Lowell Putnam Mathematical Competition*
Honorary Mention

PROFESSIONAL EXPERIENCE

- Fall 2002– *University of Texas; El Paso, TX*
Associate Professor, Department of Mathematical Sciences.
- Fall 2001–
Summer 2002 *CIMAT (Center for Research in Mathematics)*
Guanajuato, Mexico
Investigador Titular A (Researcher in Mathematics)
- Fall 1995–
Summer 2001 *University of Texas at El Paso; El Paso, TX*
Assistant Professor, Mathematics Department.
- Spring 1994–
Summer 1995 *Laney College; Oakland, CA*
Mathematics Instructor.
- Fall 1987–
Fall 1993 *University of California at Berkeley, CA*
Graduate Student Instructor and Lecturer

PROFESSIONAL SERVICE

- Reviewer of the textbook: *A modern introduction to differential equations*, by Henry Ricardo. Houghton-Mifflin 2003.
- Co-organizer of the *Special session in Low Dimensional Topology* in the VI Joint American Mathematical Society and the Sociedad Matematica Mexicana Meeting, Houston, TX, May 13–15, 2004
- Co-organizer of the *Special session in Low Dimensional Topology* in the IV Joint American Mathematical Society and the Sociedad Matematica Mexicana Meeting, Denton, TX, May 19–22, 1999
- Referee for the following mathematics journals:

Topology

Algebraic and Geometric Topology

Communications in Algebra and Geometry

Pacific Journal of Mathematics

Journal of Knot Theory and its Ramifications

Boletín de la Sociedad Matematica Mexicana.

UNIVERSITY AND DEPARTMENTAL COMMITTEE/ SERVICE WORK (UTEP)

Current committee assignments (2014)

Graduate Studies Committee (Math)

Mathematical Association of America – Department Liaison

Active Member of University Student Conduct Committee

COURSES TAUGHT

Undergraduate Courses

MATH 1508 Precalculus
MATH 1320 Mathematics for Social Sciences I
MATH 2300 Discrete Mathematics
MATH 2301 Mathematics for Social Sciences II
MATH 2303 Properties of Real Numbers
MATH 2325 Introduction to Higher Mathematics
MATH 3305 Conceptual Mathematics I
MATH 3308 Conceptual Algebra
MATH 1411 Calculus I
MATH 1312 Calculus II
MATH 2313 Calculus III
MATH 2326 Differential Equations
MATH 2327 Applied Algebra
MATH 3323 Matrix Algebra
MATH 3328 Topology
MATH 3335 Applied Analysis I
MATH 3341 Introduction to Analysis
MATH 4325 Modern Algebra
MATH 4336 Applied Analysis II
MATH 4341 Real Analysis
MATH 4399 Calculus of Several Variables
MATH 4399 Differentiable Manifolds
MATH 4399 Topology

Graduate Courses

MATH 5195 Graduate Seminar
MATH 5321 Principles of Real Analysis
MATH 5341 General Topology
MATH 5351 Complex Variables
MATH 5370 Differentiable Manifolds
MATH 5370 Algebraic Topology
MATH 5396 Differential Topology
MATH 5398 Graduate Thesis
MATH 5399 Graduate Thesis

Courses taught at other universities

Topology Workshop

Workshop on low dimensional topology aimed at students attending the *FicoFest Conference*. Merida, Yucatan, Mexico; Dec 6-15, 2002.

Topology Seminar

Universidad Autonoma de Zacatecas, Mexico; Aug 3 – 21, 1998.

Three week intensive topology seminar for advanced undergraduate and graduate mathematics students.

THESES COMMITTEE WORK

Department of Mathematical Sciences

- Master Thesis Director: *Homeomorphisms between pairs of genus two handlebodies and separating circles in their boundary*, by Daniel Vazquez. Completion date: Summer 2014.
- Master Thesis Director: *Examples of hyperbolic knots in S^3 with toroidal surgeries at distance 3*, by Cesar Garza-Garza. Completion date: May 2009.
- Master Thesis Committee: *Multiplicative Riesz decomposition on the ring of matrices over a totally ordered field*, by Julio Urenda. May 2009.
- Master Thesis Committee: *Relationships between interaction, definition, and proof*, by German Moreno. December 2003.
- Master Thesis Director: *Cobordisms and the Ham-Sandwich Theorem from a differentiable viewpoint*, by Candelario Castañeda. Unfinished, 2001.
- Master Thesis Committee: *The use of Al-Haytham's lunar figures in Math Education*, by Rula Hashem. Summer 2000.

Other Departments: Computer Science, Electrical Engineering, Physics

- Master Thesis Committee: Felipe Tovar, Physics Department, *Studies of prompt gamma and neutron yield by 2.5 MeV neutrons using GEANT4*. Summer 2009.
- Master Thesis Committee: Enrique Diaz, Physics Department, *Electroweak scale neutrinos*. May 2009.
- Master Thesis Committee: Gamboa Gonni, Physics Department, *Dependence of isoscaling on the nuclear equation of state*. Spring 2007
- Master Thesis Committee: Christian Escudero Ayala, Physics Department, *Dynamical and geometrical aspects of isoscaling*. Spring 2007

- Master Thesis Committee: Jorge Vargas, Computer Science Department, *Fast Algorithms for Computing Odd Moments in Statistical Analysis of Privacy-Related Interval Data*. Summer 2007
- Master Thesis Committee: Jesus Saenz, Physics Department, *The Fermi integrals*. Summer 2006
- Master Thesis Committee: Juan Antonio Escalera, Department of Electrical Engineering, *Fast roaming and security reinforcement of wireless LAN based on prediction of user's trajectory*. July 2005
- Master Thesis Committee: Jose Onesimo Andrade, Physics Department, *Symmetry operators for Maxwell's equations*. July 2005
- Master Thesis Committee: Luis Martin Sandoval, Physics Department, *The quantum anharmonic potential with the linear delta expansion*. June 2005
- Master Thesis Committee: Jose Valadez, Physics Department, *Neutrino mass model in extra dimensions*. May 2005
- Master Thesis Committee: Jesus Escamilla-Roa, Physics Department, *A model of nuclear matter*. August 2003.
- Master Thesis Committee: Mariano Aguirre, Electrical Engineering, *Electrical Engineering*. Spring 2000.
- Master Thesis Committee: Xiaoyu Wang, Physics Department, *Mass partitions in multifragmentation*. Spring 1997.