12095 63rd Pl N Maple Grove, MN 55369 256-626-6882 e-mail: imretuba@gmail.com website: http://ituba.scienceontheweb.net **Research Interests** Braid groups, tensor categories, bioinformatics, mathematics education. EDUCATION Sep 2000. Ph.D. in Mathematics University of California, San Diego. Thesis: Braid Representations and Tensor Categories. Advisor: Hans Wenzl. Jun 1995. A.B. in Mathematics and Chemistry Harvard University, Cambridge, Massachusetts ACADEMIC APPOINTMENTS 2017–2024. Visiting Assistant Professor. Department of Mathematics, Statistics, and Computer Science, Gustavus Adolphus College, St Peter, MN. 2016. Instructor. Art of Problem Solving, San Diego. 2014–2015. Visiting Assistant Professor. Department of Mathematics and Computer Science, Saint Louis University. 2006–2013. Assistant Professor. Department of Mathematics and Statistics and Imperial Valley Campus, San Diego State University. 2005–2006. Visiting Assistant Professor. Division of Science and Mathematics, University of Minnesota, Morris. 2003–2005. Postdoctoral Fellow. Department of Mathematics, Virginia Polytechnic Institute and State University, Blacksburg, VA. 2002–2003. Visiting Assistant Professor. Department of Mathematics, University of California, Santa Barbara. 2000–2002. Regents' Faculty Fellow. Department of Mathematics, University of California, Santa Barbara. ARTICLES Refereed publications 1. I. Tuba, H. Wenzl. Representations of the braid group B_3 and of $SL(2,\mathbb{Z})$. Pacific J. Math., 197, 2001, 491–510. 2. I. Tuba. Low-dimensional unitary representations of B₃. Proc. Amer. Math. Soc., **129**, 2001, 2597-2606. 3. I. Tuba, H. Wenzl. On braided tensor categories of type BCD. J. Reine. Angew. Math., **581**, 2005, 31-69. 4. E. Rowell, I. Tuba. Finite linear quotients of B_3 of low dimension. J. Knot Theory *Ramifications*, **19**, 2010, no. 5, 587-600.

 A. Faughn, T. Felter, N. Kent, B. Pence, C.D. Thomas, I. Tuba. Supporting Mathematics Teachers to Increase Retention. In Proc. 33rd Annual Mtg. North Amer. Chtr. Int. Grp. for the Psych. of Math. Ed., 2011, 2036-2045.

- J. Burt, I. Tuba, V. Velazquez-Victorica. Retaining Beginner Math Teachers by Empowering Them with Leadership Projects. In *Monograph on Mathematics Teacher Retention*, pages 158-165. California Mathematics Project. (2012). Los Angeles, CA.
- A. Faughn, B. Pence, J. Canzone, I. Tuba. Mathematics Teacher Retention Working Group Summary: Raising awareness to better support mathematics teachers and to increase retention. In *Monograph on Mathematics Teacher Retention*, pages 43-50. California Mathematics Project. (2012). Los Angeles, CA.
- 8. J. Burt, I. Tuba. A Multifaceted Approach to Professional Development in Imperial County, California. In *Proceedings of the 12th International Congress on Mathematical Education*, pages 5286-5295. (2012). Seoul, Korea.
- E.A. Dinsdale, R.A. Edwards, B. Bailey, I. Tuba, S. Akhter, K. McNair, R. Schmieder, N. Apkarian, M. Creek, E. Guan, M. Hernandez, K. Isaacs, C. Peterson, T. Regh, V. Ponomarenko. Multivariate analysis of functional metagenomes. *Front. Genet.* 4:41. (2013). doi: 10.3389/fgene.2013.00041
- 10. G. Ponce, I. Tuba. Synthesizing Strategies Creatively: Solving Linear Equations. *Mathematics Teacher*, **108**, Feb 2015, no. 6, 416-421.

Papers presented at refereed conferences

 K. Brown, A. Faughn, N. Kent, I. Tuba. Supporting Beginning Mathematics Teachers with Technology-Based Professional Development. 2011 Annual Meeting of the American Educational Research Association, Apr 8-12, 2011, New Orleans, LA. 24 pages.

GRADUATE STUDENTS

- Jonathan Boiser, M.S. in Applied Mathematics, 2009. Thesis: Computational Problems in the Braid Group.
- Jeffrey Burt, M.A. in Mathematics, 2015. Thesis: Computational Problems in Garside Groups.

TALKS

Conference talks

- Jan 2015. AMS Session on Mathematics Education, Joint Mathematics Meetings, San Antonio, TX. "Synthesizing pedagogical strategies to teach solving linear equations."
- Jan 2013. AMS Session on Mathematics Education and Teaching Strategies, Joint Mathematics Meetings, San Diego, CA. "Increasing retention of beginner secondary mathematics teachers through professional community building."
- Jul 2012. 12th International Congress on Mathematical Education, Seoul, Korea. "A Multifaceted Approach to Professional Development in Imperial County, California."
- Mar 2012. Mathematics Teacher Retention Symposium, Los Angeles, CA. "Interviews with Professional Development Directors." With H. Shultz, A. Mendle, E. Murphy.
- Mar 2012. Mathematics Teacher Retention Symposium, Los Angeles, CA. "Retaining Beginner Math Teachers by Empowering Them with Leadership Projects." With M. Arellano, M. Garcia, V. Velazquez-Victorica.
- Oct 2011. Psychology of Mathematics Education–North American Chapter Annual Meeting, Reno, NV. Co-presented in the "Supporting Teachers to Increase Retention" Working Group.
- Apr 2011. Annual Meeting of the American Educational Research Association, New Orleans, LA. "Supporting Beginning Mathematics Teachers with Technology-Based Professional Development." With Axelle Faughn.

- Mar 2011. Philip C. Curtis Jr. Center for Mathematics and Teaching 2011 Conference, Los Angeles, CA. "Content-driven PD for beginner secondary math teachers in the Imperial Valley." With Jeffrey Burt.
- Jan 2011. AMS Session on Mathematics Education, Joint Mathematics Meetings, New Orleans, LA. "Aligning middle and high school teachers' teaching to new algebra trends in California."
- Nov 2010. California Mathematics Council South Conference, Palm Springs, CA. "Professional development for beginner math teachers in the Imperial Valley." With Jeffrey Burt.
- Oct 2010. Psychology of Mathematics Education–North American Chapter Annual Meeting, Columbus, OH. Co-presented in the "Supporting Teachers to Increase Retention" Working Group.
- Jun 2010. VII Panamerican Workshop in Applied and Computational Mathematics, Choroní, Venezuela. "A large-scale statistical survey of environmental metagenomes."
- Apr 2010. Research Presession. Annual Meeting of the National Council of Teachers of Mathematics, San Diego, CA. "Technology-based Professional Development and Support-3 sites, 3 models." With Axelle Faughn.
- May 2008. Special Session on Hopf Algebras and Quantum Groups. AMS Western Section Meeting, Claremont, CA. "On finite braid representations."
- Jul 2007. XVII Coloquio Latinoamericano de Álgebra, Medellín, Colombia. "Finite linear quotients of the braid group B_3 ."
- Aug 2005. XVI Coloquio Latinoamericano de Álgebra, Colonia del Sacramento, Uruguay. "Toward a classification of semisimple braided tensor and ribbon categories."
- May 2005. Lie Algebras, Vertex Operator Algebras, and Their Applications, Raleigh, NC. "Reconstructing braided semisimple tensor categories."
- Nov 2004. Mid-Atlantic Algebra Conference, Fairfax, VA. "Braid group actions on semisimple tensor categories."
- Oct 2004. Special Session on Braids and Knots. AMS Western Section Meeting, Albuquerque, NM. "Braid representations and braided tensor categories."
- Jun 2004. Tensor Categories in Mathematics and Physics. Ervin Schrödinger International Institute for Mathematical Physics, Vienna, Austria. "Classifying braided semisimple tensor categories."
- Jul 2002. Interactions between Representation Theories, Knot Theory, Topology, and Mathematical Physics. SUNY Potsdam, NY. "Characterization of tensor categories of classical Lie types."
- Jun 2002. UC Berkeley/UC Santa Barbara Algebra Day, Berkeley, CA. "Classification of tensor categories of classical Lie types."
- Jan 2001. Special Session on Braid Groups, Joint Mathematics Meetings, New Orleans, LA. "Low-dimensional braid representations."

Invited talks

- Apr 2017. Mathematics Colloquium, Gustavus Adolphus College, St. Peter, MN. "An introduction to braids and topological quantum computers."
- Mar 2014. Mathematics Colloquium, University of Alaska, Achorage. "Braids, knots, and keeping secrets from your enemy."
- Mar 2014. Mathematics Colloquium, University of Alaska, Achorage. "Statistical analysis of metagenomes."

- Jun 2012. Mathematics Colloquium, Xiamen University, People's Republic of China. "Braid groups, braided tensor categories, and some current applications."
- Oct 2010. Mathematics Colloquium, College of Wooster. "Metagenomes: what they are and how to tell them apart."
- Mar 2009. Algebra Seminar, St. Louis University. "Braid groups, braided tensor categories, and an approach to quantum computation."
- Feb 2009. Mathematics Colloquium, California Lutheran University, Thousand Oaks, CA. "How can you tell two knots apart and why would you want to?"
- Mar 2006. Invited talk, San Diego State University, Imperial Valley, Calexico, CA. "Braids, knots, and representations."
- Mar 2006. Mathematics Colloquium, Hobart and William Smith Colleges, Geneva, NY. "Braids, Knots, and Windows."
- May 2005. Invited talk, University of Minnesota, Morris, MN. "Knots, links, braids, and algebra."
- Apr 2005. Algebra Seminar, Dept of Math, North Carolina State University, Raleigh, NC. "On the structure of braided, semisimple tensor categories of type BCD."
- Jul 2004. Operator Algebra Seminar. Universitá degli Studi di Roma Tor Vergata, Rome, Italy. "Classifying braided semisimple tensor categories."
- Mar 2004. Topological Quantum Computing Seminar, Dept of Math, Indiana University, Bloomington, IN. "On classifying braided tensor categories of classical Lie type."
- Mar 2004. Algebra Seminar, Dept of Math, Indiana University, Bloomington, IN. "Braid representations and how the right choice of basis can make your day."

FUNDING HISTORY

Funded external grants

- 2008-2013. "Imperial Valley Mathematics Project (IVMP)." Provides professional development and infrastructure support for K-12 math education. PI. Source: California Mathematics Project. 2012/13 annual budget: \$38,400.
- 2007-2012. "Supporting Teacher Retention for Imperial Valley Educators (STRIVE)" Provides professional development of Imperial Valley pre-service and in-service high school teachers. PI and Research Director. Source: California Mathematics Project. Amount: \$406,840.
- 2007-2008. "Mathematics and English Language Development (MELD)" Provided professional development for Imperial Valley K-2 teachers. Co-PI responsible for content development and evaluation. Source: California Postsecondary Education Commission. Amount: \$971,371.

Funded internal grants

- 2012-2013. University Grants Program. "The effects of environmental pollution on marine microbial communities." Source: SDSU. Amount: \$8112.
- 2010-2011. University Grants Program. "A large-scale functional survey of microbial metagemones from different environments." Source: SDSU. Amount: \$5469.
- 2008-2009. University Grants Program. "Density of images of braid representations and classifying ribbon categories of type ABCD." Source: SDSU. Amount: \$5609.
- 2008. Instructionally Related Activities grant to take students to the fall conference of the California Mathematics Council in Palm Springs, CA. Amount: \$1866. Source: SDSU.
- 2007. Instructionally Related Activities grant to take students to the fall conference of the California Mathematics Council in Palm Springs, CA. Amount: \$1737. Source: SDSU.

2006. Instructionally Related Activities grant to take students to the fall conference of the California Mathematics Council in Palm Springs, CA. Amount: \$1617. Source: SDSU.

Other grant applications

- 2010. NSF/NIH 1101081, "Metagenome Manifolds: Predicting quantitative responses in microbiomes." Consultant. Amount: \$1,031,120. Rejected.
- 2010. NSF 0962727, "Real Opportunities for Stimulating and Enhancing The Teaching of Algebra (ROSETTA)." Faculty collaborator. Amount: \$1,291,383. Rejected.
- 2007. NSF 06-591, "Mentoring Biology in the Imperial Valley." Co-PI. Amount: \$795,906. Rejected.
- 2006. SDSU University Grants Program "Images of unitary braid representations and ribbon categories of type ABCD." PI. Amount: \$3659. Rejected.
- 2002. NSF 0111942, "Tensor Categories and Braid Representations." Amount: \$71,008. Co-PI. Rejected.
- 2000. NSF 0309930, "Tensor Categories and Braid Representations." Amount: \$33,193. Co-PI. Rejected.

Referee experience

- 2014. Peer reviewer for the Journal of Mathematics Education.
- 2014. Reviewer of grant proposals submitted to the California Mathematics Project.
- 2014. Reviewer of grant proposals submitted to the 21st Century Community Learning Centers program of the California Department of Education.
- 2011. Peer reviewer for Linear and Multilinear Algebra.
- 2010. Peer reviewer for Revista de la Unión Matemática Argentina.
- 2010. Reviewer of grant proposals submitted to the Improving Teacher Quality grant competition of the California Postsecondary Education Commission.
- 2009. Peer reviewer for John Wiley and Sons, Inc. for a proposed textbook.
- 2001. Peer reviewer for NSF grant in the topology program.

TEACHING EXPERIENCE

- 2017–2024. Visiting Assistant Professor. Gustavus Adolphus College. The Nature of Math, Calculus with Pre-calculus Review, Calculus I and II, Multivariable Calculus, Discrete Mathematics, Linear Algebra, Introduction to Real Analysis, Geometry, Modern Algebra.
- 2016. Instructor. Art of Problem Solving. Two sections of Introduction to Algebra.
- 2014–2015. Visiting Assistant Professor. Saint Louis University. Calculus I-III and Linear Algebra.
- 2006–2013. Assistant Professor. San Diego State University. Fundamentals of Mathematics, Intermediate Algebra, Transition to Higher Mathematics, History of Mathematics, Mathematics for the Middle Grades, Mathematics Curriculum and Instruction, Foundations of Geometry, Linear Algebra, Abstract Algebra, Combinatorics.
- 2005–2006. Visiting Assistant Professor. University of Minnesota, Morris. Calculus I and II, Linear Algebra.
- 2003–2005. Postdoctoral Fellow. Virginia Tech. Applied Combinatorics and Graph Theory, Modern Algebra.
- 2000–2003. Visiting Assistant Professor/Regents' Faculty Fellow. UCSB. Precalculus, Calculus for Social and Life Sciences, Calculus with Applications I and III, Differential Equations and Fourier Series.

LANGUAGES

Hungarian (native), Italian (fluent), Spanish (conversational), German (reading), French (reading).