Imre Tuba — Curriculum Vitae

San Diego State University
Imperial Valley Campus
720 Heber Ave.
Calexico, CA 92231
760-768-5606
e-mail: ituba@mail.sdsu.edu
URL: www-rohan.sdsu.edu/~ituba

514 Sandalwood Dr.
El Centro, CA 92243
760-352-8380

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

May 2006–present. **Assistant Professor**. Department of Mathematics and Statistics and Imperial Valley Campus, San Diego State University.

Aug 2005–May 2006. **Visiting Assistant Professor**. Division of Science and Mathematics, University of Minnesota, Morris.

Aug 2003–Aug 2005. **Postdoctoral Fellow**. Department of Mathematics, Virginia Polytechnic Institute and State University, Blacksburg, VA.

Jul 2002–Jun 2003. **Visiting Assistant Professor**. Department of Mathematics, University of California, Santa Barbara.

Jul 2000–Jun 2002. **Regents' Faculty Fellow**. Department of Mathematics, University of California, Santa Barbara.

Articles

Papers in refereed journals and conference proceedings

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 B_3. *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.
5. A. Faughn, T. Felter, N. Kent, B. Pence, C.D. Thomas, I. Tuba. Supporting Mathematics Teachers to Increase Retention. To appear *Proc. 33rd Annual Mtg. North Amer. Chtr. Int. Grp. for the Psych. of Math. Ed.*, 11 pages.

Papers presented at refereed conferences

1. K. Brown, A. Faughn, N. Kent, I. Tuba. Supporting Beginning Mathematics Teachers with Technology-Based Professional Development. Presented at the *2011 Conference of the American Educational Research Association*, 24 pages.

Papers under review

1. 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. Submitted to *Nature Methods*. 21 pages.

Graduate students

Jonathan Boiser, M.S. in Applied Mathematics, 2009. Thesis: Computational Problems in the Braid Group.

Talks

Conference talks

Apr 2011. 2011 American Educational Research Association Annual Meeting, 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

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 research grants

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.

Funded teaching and training grants

2007-2011. "Supporting Teacher Retention for Imperial Valley Educators (STRIVE)" Provides professional development of Imperial Valley pre-service and in-service high school teachers. PI. Source: California Mathematics Project. Amount: $406,840.

2008-2012. "Imperial Valley Mathematics Project (IVMP)." Provides professional development and infrastructure support for K-12 math education. Co-PI. Source: California Mathematics Project. Current annual budget: $44,460.

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.

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 funded grants

2000-2002. Regents' Faculty Fellowship. This is a teaching/research fellowship that provides full academic salary. I was awarded the fellowship for the 2000/2001 academic year, then again for 2001/2002. Source: Regents of the University of California.

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.

Awards, prizes, memberships

1992–1995. Harvard College Scholar. This is an honorary scholarship Harvard College awards for academic achievement.

1989. Bronze medal at the XXI. International Chemistry Olympics in Halle, East-Germany.

Referee experience

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

2006–present. Assistant Professor. San Diego State University.

Fall semester 2011. GMS 91, Intermediate Algebra. 22 students.
Fall semester 2011. Math 303, History of Mathematics. 18 students.
Fall semester 2011. Math 521A, Abstract Algebra. 11 students.
Spring semester 2011. GMS 91, Intermediate Algebra. 13 students.
Spring semester 2011. Math 414, Mathematics Curriculum and Instruction. 8 students.
Spring semester 2011. Math 524, Linear Algebra. 4 students.
Fall semester 2010. GMS 91, Intermediate Algebra. 4 students.
Fall semester 2010. Math 302, Transition to Higher Mathematics. 12 students.
Fall semester 2010. Math 510, Introduction to the Foundations of Geometry. 10 students.
Spring semester 2010. Math 413, Mathematics for the Middle Grades. 4 students.

Spring semester 2010. Math 521B, Abstract Algebra. 5 students.
Fall semester 2009. GMS 91, Intermediate Algebra. 8 students.
Fall semester 2009. Math 303, History of Mathematics. 19 students.
Fall semester 2009. Math 521A, Abstract Algebra. 9 students.
Spring semester 2009. Math 302, Transition to Higher Mathematics. 12 students.
Spring semester 2009. Math 510, Introduction to the Foundations of Geometry. 8 students.
Fall semester 2008. General Math Studies 91, Intermediate Algebra. 11 students.
Fall semester 2008. Math 414, Mathematics Curriculum and Instruction. 10 students.
Fall semester 2008. Math 524, Linear Algebra. 3 students.
Spring semester 2008. Math 303, History of Mathematics. 11 students.
Spring semester 2008. Math 521B, Abstract Algebra. 6 students.
Fall semester 2007. Math 413, Mathematics for the Middle Grades. 10 students.
Fall semester 2007. Math 521A, Abstract Algebra. 7 students.
Fall semester 2007. Math 579, Combinatorics. 5 students.
Spring semester 2007. Math 302, Transition to Higher Mathematics. 18 students.
Spring semester 2007. Math 510, Introduction to the Foundations of Geometry. 12 students.
Fall semester 2006. Math 313, Topics in Elementary Mathematics. 25 students.
Fall semester 2006. Math 524, Linear Algebra. 6 students.

2005–2006. Visiting Assistant Professor. University of Minnesota, Morris.
Spring semester 2005. Math 1101, Calculus I. 16 students.
Spring semester 2005. Math 1102, Calculus II. 12 students.
Fall semester 2005. Math 1101, Calculus I. 12 students.
Fall semester 2005. Math 2111, Linear Algebra. 17 students.

2003–2005. Postdoctoral Fellow. Virginia Tech.
Spring semester 2005. Math 3134, Applied Combinatorics and Graph Theory. 37 students.
Spring semester 2004. Math 3124, Modern Algebra. 14 students.

2000–2003. Visiting Assistant Professor/Regents' Faculty Fellow. UCSB.
Spring quarter 2003. Math 5C, Differential Equations and Fourier Series. 78 students.
Winter quarter 2003. Math 3C, Calculus with Applications, Third Course. 103 students.
Winter quarter 2003. Math 34A, Calculus for Social and Life Sciences. 272 students.
Fall quarter 2002. Math 34A, Calculus for Social and Life Sciences. 188 students.
Spring quarter 2002. Math 34A, Calculus for Social and Life Sciences. 70 students.
Winter quarter 2002. Math 34B, Calculus for Social and Life Sciences. 93 students.
Fall quarter 2001. Math 3A, Calculus with Applications. 122 students.
Spring quarter 2001. Math 34B, Calculus for Social and Life Sciences. 86 students.
Spring quarter 2001. Math 15, Precalculus. 16 students.
Winter quarter 2001. Math 34A, Calculus for Social and Life Sciences. 110 students.

Languages

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