

# JOHN HUERTA

## CURRICULUM VITAE

Department of Mathematics  
University of California  
Riverside, CA 92521 USA

phone: +1.951.756.3439

web: <http://math.ucr.edu/~huerta>

email: [huerta@math.ucr.edu](mailto:huerta@math.ucr.edu)

## Research interests

*Physics:* superstrings, supergravity, and (higher) gauge theory.

*Mathematics:* Lie groups, geometry, and exceptional mathematics.

## Education

**Ph.D. in Mathematics**, University of California, Riverside, June 2011.

Advisor: Professor **John C. Baez**

Thesis: *Supersymmetry, Division Algebras and Higher Gauge Theory*

**M.S. in Mathematics**, University of California, Riverside, June 2008.

**B.S. in Physics and Mathematics**, Magna Cum Laude, Northern Arizona University, 2002.

## Papers

1. **Division algebras and supersymmetry III**, in preparation.
2. **The octonions** (with John Baez). To appear in *Scientific American*.
3. **An invitation to higher gauge theory** (with John Baez). To appear in *General Relativity and Gravitation*. Available as [arXiv:1003.4485](https://arxiv.org/abs/1003.4485).
4. **Division algebras and supersymmetry II** (with John Baez). Available as [arXiv:1003.3436](https://arxiv.org/abs/1003.3436).
5. **Division algebras and supersymmetry I** (with John Baez), to appear in *Proceedings of the NSF/CBMS Conference on Topology, C\* Algebras, and String Theory*. Available as [arXiv:0909.0551](https://arxiv.org/abs/0909.0551).
6. **The algebra of grand unified theories** (with John Baez), *Bull. Amer. Math. Soc.* **47** (2010), 483–552. Also available as [arXiv:0904.1556](https://arxiv.org/abs/0904.1556).

## Invited Talks

**Supersymmetry, division algebras and Lie  $n$ -algebras**, 5 November 2010, *Special Session on Topology, Geometry and Physics*, AMS Fall Central Sectional Meeting, South Bend, IN.

**Supersymmetry, division algebras and Lie  $n$ -algebras**, 4 November 2010, the geometry and physics seminar, Northwestern University, Evanston, IL.

**Supersymmetry, division algebras and Lie  $n$ -algebras: a pretalk**, 4 November 2010, the geometry and physics seminar, Northwestern University, Evanston, IL.

**Introducing the quaternions**, 27 September 2010, mathematics colloquium, Fullerton College, Fullerton, CA.

**Lie  $n$ -algebras, supersymmetry and division algebras: in brief**, 7 June 2010, *Quantum Fields and Strings: Categorical Aspects*, Mathematisches Forschungsinstitut Oberwolfach, Oberwolfach, Germany.

**Supersymmetry, division algebras and Lie  $n$ -algebras**, 3 June 2010, *Higher Structures IV*, the Courant Institute, Göttingen, Germany.

**Supersymmetry, division algebras and Lie  $n$ -algebras**, 20 April 2010, the Claremont topology seminar, Claremont, CA.

**The quaternions**, 21 May 2010, mathematics and physics colloquium, Cal State Stanislaus, Turlock, CA.

**Division algebras and supermembranes**, 7 November 2009, *Special Session on Research Conducted by Students*, AMS Fall Western Sectional Meeting, Riverside, CA.

**Supersymmetry and division algebras**, 22 June 2009, *2nd Mile High Conference in Nonassociative Mathematics*, University of Denver, Denver, CO.

## Other Talks

**Division algebra technology for supersymmetry**, 6 November 2010, *Contributed Paper Session*, AMS Fall Central Sectional Meeting, South Bend, IN.

**Addressing on fractals and iterated function systems**, 22 February 2010, the dynamical systems seminar, UC Riverside, Riverside, CA.

**Jordan algebras and projective geometry**, 17 February 2010, the mathematics graduate student seminar, UC Riverside, Riverside, CA.

**A crash course in simplicial methods**, 22 January 2010, the cobordism seminar, UC Riverside, Riverside, CA.

**The interaction of quantum field theory and topology**, 23 October 2009, the cobordism seminar, UC Riverside, Riverside, CA.

**Grand unified theories**, 13 November 2008, the mathematical physics seminar, UC Riverside, Riverside, CA.

**Quantum mechanics and representation theory**, 5 June 2008, the mathematical physics seminar, UC Riverside, Riverside, CA.

**The octonions**, 10 April 2008, the mathematical physics seminar, UC Riverside, Riverside, CA.

**Five lectures on grand unified theories**, Spring 2008, the quantum gravity seminar, UC Riverside, Riverside, CA.

## Awards and Support

Oberwolfach Leibniz Graduate Student, 2010.

Graduate Student Researcher, UC Riverside, 2009–2010.

Graduate Research Mentorship Fellowship, UC Riverside, 2008–2009.

Teaching Assistantship, UC Riverside, 2005–2011.

Chancellor's Fellowship, UC Riverside, 2005–2007.

Senior Slipper Scholar in Physics, Northern Arizona University, 2001–2002.

Karen and Terrence Hall Scholar in Mathematics, Northern Arizona University, 2001–2002.

Chair's Scholar in Physics, Northern Arizona University, 1998–2001.

## Teaching Experience

**As a Lecturer:** University of California, Riverside, various positions.

Graduate level:

**Topology qualifying exam seminar**, UC Riverside, Summer 2008.

**Quantum gravity seminar**: five lectures on grand unified theories, UC Riverside, Spring 2008.

**Quantum field theory seminar** (organizer), UC Riverside, Fall 2006–Spring 2007.

Undergraduate level:

**Introductory calculus**, UC Riverside, Summer 2007.

**As a Teaching Assistant:** University of California, Riverside, 2005–2011.

Lower division:

*College Algebra; Precalculus; Introductory Calculus; Business Calculus; Vector Calculus; Discrete Mathematics; Differential Equations.*

Upper division:

*Linear Algebra; Set Theory; Advanced Calculus; Complex Analysis; Abstract Algebra.*

## Other

Maintain a webpage on [L<sup>A</sup>T<sub>E</sub>X for beginners](#).

Always available for the discussion of mathematics and physics.

## References

*Research:*

Professor John C. Baez, [baez@math.ucr.edu](mailto:baez@math.ucr.edu), University of California, Riverside.

Professor Michel Lapidus, [lapidus@math.ucr.edu](mailto:lapidus@math.ucr.edu), University of California, Riverside.

Doctor Urs Schreiber, [urs.schreiber@gmail.com](mailto:urs.schreiber@gmail.com), University of Utrecht, Utrecht.

*Teaching:*

Professor Albert Stralka, [stralka@math.ucr.edu](mailto:stralka@math.ucr.edu), University of California, Riverside.