

# Eduardo Sáenz-de-Cabezón

## *Curriculum Vitae*

**Contact** Department of Mathematics  
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## **Research Interests**

Symbolic Computation, Computational Commutative Algebra, Homological Algebra, Algebraic Statistics, Algebraic methods in Reliability Theory, Computacional Topology.

## **Education**

*Ph.D., Mathematics*, Feb. 2008  
Universidad de La Rioja  
Spain  
Thesis: *Combinatorial Koszul Homology: Computations and Applications*  
Advisors: Prof. Dr. Luis Javier Hernández (U. La Rioja), Prof. Dr. Werner M. Seiler (U. Kassel, Germany)  
*M.S., Mathematics*, July 2003  
*B.S., Mathematics*, September 2001  
U. La Rioja  
*B.S., Theology*, June 1996  
U. P. Comillas (Spain)

## **Professional Status**

Assistant professor  
U. La Rioja  
Starting date: Oct. 2005  
Specialization (UNESCO codes): 1203,1201

## **Language Skills (R=Regular, G=Good, C=Correct)**

**Spanish, mother tongue.**

### **English**

Speaking (G), Reading (C), Writing (G)

### **French**

Speaking (R), Reading (G), Writing (R)

### **German**

Speaking (G), Reading (G), Writing (G)

## Participation in research projects

*Categorías Homotópicas*

12/2000-12/2003

Funding organization: Ministry of Education and Science

*Calculemus*

1/2002-12/2004

Funding organization: Program FP5 of the European Union

*Global Integrability of Field Theories (GIFT)*

1/2005-12/2006

Funding organization: NEST (New and Emerging Science and Technology), program FP6 of the European Union

*Teoría de la forma, espacios exteriores y categorías de Galois*

1/2005-12/2005

Funding organization: U. de La Rioja (API05/B07)

*Teoría de la forma, espacios exteriores y categorías de Galois*

9/2005-9/2006

Funding organization: Comunidad Autónoma de La Rioja (ANGI-2006/10).

## Employment

10/2001–9/2005 Associate professor

Mathematics department, U. La Rioja

10/2001–9/2002 Research collaboration grant

Mathematics department, U. La Rioja

10/1996–9/2005 Secondary school teacher

Logroño, Spain

## Publications

with H. P. Wynn, Minimal free resolution and tight multi-state system reliability bounds, *Journal of Symbolic Computation* 44:1311-1325, 2009

Bordered magic squares: Elements for a comprehensive approach, *Ars Combinatoria*, *to appear*; 2008

Mayer-Vietoris trees of Monomial Ideals, *Proceedings GIFT 2006*, Universitätsverlag Karlsruhe, pp. 311-334; 2006

Cuadrados mágicos concéntricos, *Gaceta de la Real Sociedad Matemática Española* 2,3, pp. 561-563; 1999

with J. Rubio and F. Sergeraet, Minimal resolutions, *submitted*; 2007

Multigraded Betti numbers without computing minimal free resolutions, *submitted*; 2007

## Participation in conferences

Partial Derivations of Functions over Cubic Sets. Applications in Function Approximation, homology computations and data study, First International meeting AMS-RSME; Sevilla (Spain) 2003

with J.I. Extremiana, L.J. Hernández and M.T. Rivas, Anillos de Funciones discretas sobre complejos cúbicos, homología y cohomología, X Encuentro de Topología; Bilbao (Spain) 2003

with J.I. Extremiana, L.J. Hernández and M.T. Rivas, Anillos de Funciones discretas sobre complejos cúbicos, III Encuentro Andaluz de Matemática Discreta; Almería (Spain) 2003

Partición de Polígonos rectilíneos en número mínimo de rectángulos equilibrados; III Encuentro Andaluz de Matemática Discreta; Almería (Spain) 2003

Combinatorial Spencer Complex, EACA 2004; Santander (Spain) 2004

Combinatorial Spencer Complex, ISSAC 2004; Santander (Spain) 2004

Computing Koszul Homology of Monomial Ideals, RWCA 2006; Basel (Switzerland) 2006

Recursion Trees of Monomial Ideals, EACA 2006; Sevilla (Spain) 2006

Mayer-Vietoris Trees of Monomial Ideals, GIFT Meeting 2006; Daresbury (UK) 2006

with H.P. Wynn, Betti numbers and minimal free resolutions for multi-state system reliability bounds, MEGA 2007; Strobl(Austria) 2007

Homological Description of Monomial ideals computing Mayer-Vietoris trees, MEGA 2007; Strobl (Austria) 2007

with H.P. Wynn, Minimal free resolution and tight multi-state system reliability bounds, MMR 2007; Glasgow(Scotland), 2007

Multigraded Betti numbers of monomial ideals and their applications, CoCoA School 2007; Hagenberg (Austria) 2007

An example of interaction of homological and combinatorial tools in commutative algebra, First French-Spanish Mathematical Congress (Workshop on Constructive Mathematics and Symbolic Computation); Zaragoza (Spain) 2007

Algebraic methods for system reliability bounds, Workshop Mathematical Methodologies for Operational Risk; EURANDOM, Eindhoven, (The Netherlands) 2007

with H. P. Wynn, Computational algebraic algorithms for the reliability of generalized  $k$ -out-of- $n$  and related systems, ACA 2008; Hagenberg (Austria) 2008

On the  $(n - 1)$ -st Koszul homology of monomial ideals, EACA 2008; Granada (Spain) 2008

with H. P. Wynn, Minimal free resolutions for tight Bonferroni bounds, SAMSI Kick-off Workshop, Program on Algebraic Methods in Statistics and Biology; Raleigh (USA) 2008

Algebra conmutativa combinatoria: Herramientas topológicas, IV Seminario de Topología y Categorías; Logroño, (Spain) 2009

with H. Maruri and H. P. Wynn, Complexity of experimental designs and polynomial models via Betti numbers, Transition Workshop, Program on Algebraic Methods in Statistics and Biology; Raleigh (USA) 2009

with L. J. Hernández, M.T. Rivas, V. Marco, E. García, I. Pérez and F.J. Sáenz-de-Cabezón, A computer implementation of the Partition of the Unity procedure and its applications to arthropod population dynamics. A case study on the european grape berry moth, ACA 2009; Montreal (Canada) 2009

## Research stays

IAKS Karlsruhe, Germany, 2003-2004, 32 weeks, subject: Computational homology and involution

IAKS Karlsruhe, Germany, 2005, 4 weeks, subject: Koszul homology

U. Heidelberg, Germany, 2006, 4 weeks, subject: Koszul homology

London School of Economics, UK, 2006, 1 week, subject: Algebraic methods in reliability theory

London School of Economics, UK, 2007, 1 week, subject: Algebraic methods in reliability theory

## Memberships

1997–present Royal Spanish Mathematical Society (RSME)

## Miscellaneous

Participation and member of the Organizing Committee in the conference Category theory and Applications. Logroño (Spain), 2002.

Speaker of the talk *Cálculo de la homología de Koszul*, Seminary of Computer Science of the Mathematics and Computer Science dept. at the U. La Rioja, 2004.

Speaker of the talk *Matemáticas para contar, o viceversa*, Seminary of Actualization in Mathematics at the U. La Rioja, 2005.

Participation in the CoCoA School Alghero (Italy), 2005.

Participation in the Workshop on Symbolic Computation and Formal Methods. U. La Rioja; April 5 and 6, 2006.

Speaker of the talk *Un ejemplo en estadística algebraica: Fiabilidad de sistemas coherentes*. Seminary of Actualization in Mathematics at the U. La Rioja. 2007.

Participation in the CoCoA School Hagenberg (Austria), 2007.

Reviewer for Zentralblatt MATH - ZMATH Online Database 2008 – present

June 30, 2009