

JAVIER ARSUAGA CURRICULUM VITAE

Mathematics Department
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PROFESSIONAL EXPERIENCE

- 2005-present **Assistant Professor in Mathematics**
San Francisco State University, San Francisco, CA.
- 2003-2005 **Associate Specialist at UCSF Comprehensive Cancer Center** (step 4)
University of California, San Francisco, CA.
P. I.: Prof. Allan Balmain
- 2000-2003 **Postdoctoral Fellow in Mathematics and in Molecular and Cell Biology**
University of California, Berkeley, CA.
Mentor in the Mathematics Department: Prof. R. K. Sachs
Mentor in the Molecular and Cell Biology Department: Prof. N. R. Cozzarelli
- 1995-2000 **Research Assistant**
Florida State University, Tallahassee, FL.
Mentor: Prof. D. W. Sumners
- 1997 **Three month summer intern Bioinformatics Scientific Computing Consulting**
SmithKline Beecham Pharmaceuticals Research and Development
Upper Merion, PA.
- 1995-1997 **Teaching Assistant,**
Florida State University, Tallahassee, FL.
- 1994-1995 **Linear Algebra Instructor**
Zaragoza University, Zaragoza, Spain.
- 1992-1993 **Undergraduate Research Assistant**
Zaragoza University, Zaragoza, Spain.
Mentor: Prof. L. J. Boya

RESEARCH INTERESTS

- Applications of topology and stochastic methods to molecular biology and genetics.
- DNA topology and the 3D structure of chromosomes
 - Analysis of breast cancer CGH profiles using computational homology.
 - DNA Repair/Missrepair processes

VISITING POSITIONS

- 2007 **Very Important (long term) Visitor** (Fall semester)
Institute for Mathematics and its Applications (IMA)
University of Minnesota, Minneapolis, MN
- 2007 **1 month visitor** (July)
Prof. Eugenio Santos Laboratory

Centro de investigacion del Cancer de Salamanca
Universidad de Salamaca, Salamanca, Spain
2006 **2 month visitor** (July –August)
Prof. D. Sherratt laboratory,
Biochemistry Department
University of Oxford, Oxford, UK

EDUCATION

2000 **Ph.D., Mathematics**
Florida State University, Tallahassee, FL.
Ph.D. Mentors: Profs. D. W. Sumners and J. Roca
Title: Knots as an assay for DNA organization inside bacteriophage P4 capsids
1993 **B.Sc., Mathematics**
Zaragoza University, Zaragoza, Spain.

HONORS, FELLOWSHIPS, SCHOLARSHIPS AND AWARDS

2008 Representative of the IMA in “Math Institutes Modern Mathematics” conference
2007 California State University Summer Research Stipend
2006 California State University Summer Research Stipend
1997-2000 Fellow of the Program in Mathematics and Molecular Biology (PMMB)
1992-1993 Research Scholarship for interdisciplinary studies, Zaragoza University
1989-1993 Undergraduate Scholarship "Colegio de Médicos de Zaragoza"

PROFESSIONAL DEVELOPMENT

2009 Participant of the 3rd Comprehensive Cancer Center Research Training Program (CC RTP) at Stanford University (09/28/09-10/02/09)

ENDED GRANT SUPPORT

2008 (PI: S. Hosten and Co-PI: J. Arsuaga) 09/01/2008 – 12/31/2008
CSUPERB \$15,000
Detecting Chromosome Clustering in Human Lymphocytes
2007 (PI: D. Arnold) 08/01/07-12/31/07 2.0A/0.0S
National Science Foundation,
Subcontract to SFSU from Institute of Mathematics and its Applications (IMA)
University of Minnesota, Minnesota, MN
Amount: Teaching Release (2 courses) and Travel allowance to visit IMA
during the Fall semester of 2007
2007 IMA Thematic Year on Mathematics of Molecular and Cellular Biology
2006 Detecting Chromosome Clustering in Human Lymphocytes and Fibroblasts
Agency: Center for Computing in the Life Sciences (CCLS, SFSU)
Grant-type: Mini-grant
Amount: \$7,000
P.I. Prof. J. Arsuaga and Prof. S. Hosten
Author: J. Arsuaga and S. Hosten
2006 SFSU-UCSFCC partnership program
Agency: National Institute of Health (NIH)
Grant-type: U56
Amount: One class release during Fall 06

- P.I.: Prof. B. Macher
- 2005 A systems biology study of nuclear architecture: a computational investigation of transcription in the Interchromatin Domain Compartment (ICD) in human B-Lymphocytes
 Agency: Center for Computing in the Life Sciences (CCLS, SFSU)
 Grant-type: Mini-grant
 Amount: \$3,500
 P.I. Prof. J. Arsuaga
 Author: J. Arsuaga
- 2002 Modeling chromosome aberrations, chromatin organization and enzymatic actions
 Agency: National Science Foundation (NSF)
 Grant type: Creativity extension grant DMS-9971169 (4 years)
 Amount: \$215,000
 P.I.: Prof. R. K. Sachs
 Authors: Dr. J. Arsuaga, Dr. M. Vazquez and Prof. R. K. Sachs
- 2002 Uncovering chromosome geometry using microarrays
 Agency: National Institute of Environmental Health Sciences (NIEHS)
 Grant-type: Mini-grant
 Amount: \$11,000
 P.I.: Prof. N. R. Cozzarelli
 Authors: Dr. J. Arsuaga, Ms. L. Postow and Prof. N. R. Cozzarelli
- 2002 Computer analysis of microarray data for irradiated human lymphocytes
 Agency: National Institute of Environmental Health Sciences (NIEHS)
 Grant-type: Mini-grant
 Amount: \$10,500
 P.I.: Prof. R. K. Sachs
 Authors: Dr. J. Arsuaga and Prof. R. K. Sachs
- 2002 Computer analysis of microarray data
 Agency: Center for Pure and Applied Mathematics (CPAM, UC Berkeley)
 Grant-type: Mini-grant
 Amount: \$ 5,000
 P.I.: Prof. R. K. Sachs
 Authors: Dr. J. Arsuaga and Prof. R. K. Sachs
- 2001 Using knots as an assay for DNA packing in bacteriophages.
 Agency: Center for Pure and Applied Mathematics (CPAM, UC Berkeley)
 Grant-type: Mini-grant
 Amount: \$5,000
 P.I.: Prof. R. K. Sachs
 Authors: Dr. J. Arsuaga and Prof. R. K. Sachs

CURRENT GRANT SUPPORT

ACTIVE

2S06GM52588-12 (PD: L.Marquez/P.I.: J. Arsuaga)	01/01/2007 – 12/31/2010
Time base: 4.6A/2.0S	
NIH/SCORE	\$299,346
Computer modeling of DNA double strand break repair	

The major goal of this project is to develop computer software that simulates recruitment of DNA repair proteins to double strand breaks.

2P20MD000544-06 (A. Corrigan/B. Macher PL: J. Arsuaga; Co-PL: M. Vazquez)
10/02/2008 – 10/01/2013 Time Base: 1.0 A/1.0S
NIH/RIMI \$365,000
Multiscale analysis of CGH arrays from breast cancer patients using computational algebraic topology.

We are developing computer software that implements concepts from algebraic topology to analyze CGH patterns from breast cancer patients

0920887 (PI: J. Arsuaga/Co-PI: M. Vazquez/Co-PI: Prof. Diao)
08/28/09 – 08/27/12 Time Base: 0.0A/1.0S
NSF/DMS \$720,000
Collaborative Research: Topological Characterization of DNA Organization in Bacteriophages
Note: \$440,000 to SFSU and \$280,000 to UNCC

Mathematical modeling (using knot theory) of DNA packing in bacteriophages

INVITED PRESENTATIONS AT CONFERENCES

18. Using knot theory to understand DNA packing in viruses
Math Institutes Modern Mathematics (Preliminary session to SACNAS)
Salt Lake City, (10/08/08)
17. DNA knotting in spooling like conformations in bacteriophages
Conference on Knots and other entanglements in Biopolymers:
Topological and Geometrical aspects of DNA, RNA and Protein Structures
The Abdus Salam International Center for Theoretical Physics, Trieste, Italy,
(09/15/08-09/19/09)
16. DNA knotting in spooling like conformations in bacteriophages
International workshop in knots and macromolecules
Venice, Italy, (03/06/08-03/08/08).
15. Linking of chromosomes during interphase
Join meeting of the Mexican and Japanese Mathematical Societies
Kyoto, Japan (12/03/07-12/07/07)
14. DNA knots from bacteriophage P4 suggest a chromosomal organization with high writhe values
Mathematical Virology Workshop
Edinburgh, UK, (08/06/07-06/10/07)
13. Topological considerations of the interphase nucleus
Mathematics of Knotting and Linking in Polymer Physics and Molecular Biology
Banff International Research Extension for mathematical Innovation and Discovery
Banff, Canada, (05/21/07-05/25/07)
12. DNA knots from bacteriophage P4 suggest a chromosomal organization with high writhe values
Summers Fest. A conference in low-dimensional topology and applications to molecular biology and biomedical mathematics,
Tallahassee, FL (05/04/07-05/05/07)
11. Linking of chromosomes during Interphase
1020 Sectional AMS meeting. Cincinnati, OH, (10/22/06)

10. DNA knotting under geometrical constraints: organization of DNA in phage capsids
International Workshop on Knot Theory for Scientific Objects, Osaka, Japan
(03/08/06-03/10/06)
9. New biomarkers for biodosimetry
Biodosimetry: Current and Evolving Technologies.
NIAID/NIH-sponsored workshop; Bethesda, MD 2005
8. DNA knots reveal a chiral organization in P4 capsids
3rd Joint Meeting Japan-Mexico; Oaxaca, Mexico 2004
7. DNA knots reveal a chiral organization in P4 capsids
Knots in Washington XIX (Topology in Biology/Chemistry II); Washington DC 2004
6. Chromosome organization in *Escherichia coli*
Topology in Condensed Matter Physics; Dresden, Germany, 2002
5. DNA knots prove non-random packing in bacteriophages
Workshop: research at the interface between mathematics and biology; Tucson, AZ,
2001
4. DNA packing in bacteriophages
Schloessmann Seminar on Mathematical Models in Biology, Chemistry and Physics
Bad Lausick, Germany, 2000
3. Using random knotting to analyze DNA packing in viral capsids
Special Session on Knot Theory and Its Applications
949th AMS meeting. Charlotte, NC, 1999
2. Characterizing DNA knots from bacteriophage P4
Special Session on DNA Topology; 948th AMS meeting. Austin, TX, 1999
1. Applications of Geometry, Topology and Computer Science to the study of DNA
Dept. of Geometry and Topology (2 lectures).
CIMAT, Guanajuato, Mexico, 1998

INVITED LECTURES/COLLOQUIA

22. Using computational homology to predict recurrence on early breast cancer patients
CS Graduate Seminar Series
SFSU, San Francisco CA (09/23/09)
21. Some Applications of Knot Theory to Molecular Biology
MSRI Colloquium in the undergraduate program MSRI-UP: Experimental Mathematics
Berkeley, CA 2008 (07/03/08)
20. Using computational homology to analyze CGH profiles from Breast Cancer Patients
CS Graduate Seminar Series
SFSU, San Francisco CA (02/27/08)
19. DNA knots help understand chromosome organization in bacteriophages
Seminar series "The Entanglement of Biology and Mathematics"
Center for Applied Mathematics
University of St. Thomas, Minneapolis, MN (10/10/07)
18. DNA knots help understand chromosome organization in bacteriophages
Applied Mathematics Seminar, School of Mathematics
University of Minnesota, Minneapolis, MN 2007
17. Quantitative analysis of radiation induced chromosome aberrations
Special mathematical Biology seminar, Institute of Mathematics and its applications
(IMA)
University of Minnesota, Minneapolis, MN 2007
16. Analisis cuantitativo de aberraciones cromosomicas radio-inducidas
Centro de Investigación del Cancer, CID-CSIC-Universidad de Salamanca

- Salamanca, Spain 2007
15. Using knots to study DNA packing in viruses
CSU Chico, Chico, REU Summer Program CA (06/22/07)
 14. Understanding Chromosome Aberrations: Quantifying the Chromosome Proximity Effect.
SFSU/City College of San Francisco Bridges Seminar series 2006
 13. Understanding nuclear architecture through radiogenic aberrations
SFSU Colloquium in Microbiology, Cell and Molecular Biology. Biology Dept. San Francisco State University, San Francisco, CA 2005
 12. DNA knots reveal a chiral organization in P4 capsids
Computational Biology Seminar; University of California at Berkeley, Berkeley, CA 2005
 11. DNA packing in bacteriophages
Joint topology seminar UC and Universidad de Zaragoza
Zaragoza University, Zaragoza, Spain, 2004
 10. A Microarray study of the topological structure of the bacterial chromosome
Colloquium Biocomputation Institute; Zaragoza University, Zaragoza, Spain, 2004
 9. Quantitative analysis of mFISH data
Seminar in Progress in Cell and Cancer Biology; Centro de Investigaciones Médicas Aplicadas; Pamplona University, Pamplona, Spain 2004
 8. New insights in DNA repair and nuclear architecture gained from computational analysis of mFISH
Statistics and Genomics seminar; University of California at Berkeley, Berkeley, CA 2003
 7. A functional genomics study of the bacterial chromosome
Applied Mathematics Seminar; University of California at Berkeley, Berkeley, CA 2003
 6. Using graph theory to analyze chromosome aberrations
Colloquium Dept. of Mathematics; San Jose State University, San Jose, CA 2002
 5. Computer analysis of M-FISH data
Institute for Human Genetics; Ludwig Maximilian University. Munich, Germany, 2002
 4. Computer analysis of M-FISH data
Dept. of Genetics and Skin Carcinogenesis; German Cancer Research Center. Heidelberg, Germany, 2002
 3. DNA packing in bacteriophages
Dept. of Biochemistry; Oxford University. Oxford, UK, 2000
 2. DNA packing in bacteriophages
Colloquium. Dept. of Biochemistry. Institute of Molecular Biophysics
Florida State University. Tallahassee, FL. 1999
 1. DNA and knot theory
Dept. of Molecular and Cell Biology; CID-CSIC, Barcelona, Spain, 1995

SELECTED CONTRIBUTED PRESENTATIONS

18. (Poster) Using homology to detect copy number variation associated with breast cancer recurrence.
D. DeWoskin, R. Scharein, M. Vazquez, C. Park , J. Arsuaga
3rd comprehensive cancer research training program at Stanford University..
Stanford University, CA. (09/28/09-10/02/09)
17. (Poster) DNA Knotting in Spooling like conformation in bacteriophages.
M. Vazquez, B. Borgo, M. Hardin, R. Scharein, Y. Diao and J. Arsuaga
28th Annual Meeting of the American Society for Virology
Vancouver, Canada (07/11/09-07/15/09)

16. (Poster) Detecting Genomic Instability in Breast Cancer CGH Profiles Using Computational Homology
Daniel DeWoskin, Javier Arsuaga, Catherine Park
2009 UCSF Breast Oncology Program Retreat (01/29/09)
15. (Poster) Using Persistent Homology to Analyze Breast Cancer CGH Data
J. Climent, I. Cruz, J. L. Garcia, J. Perez-Losada, J. Arsuaga
2008 UCSF Breast Oncology Program Retreat (01/31/09)
14. (Talk) Using knot theory to study DNA packing in bacteriophages
Asilomar Chromatin and Chromosomes Conference (12/10/08-12/13/08)
13. (Talk) Mathematical methods to study the relative position of chromosomes during interphase in human cells.
Workshop on Mathematics of DNA structure, function and interactions.
Institute of Mathematics and its Applications (IMA)
University of Minnesota, Minneapolis, MN 2007. (09/16/07-09/21/07)
12. (Poster) The role of chromosome positioning in chromosome instability: a comparative study between human lymphocytes and fibroblasts
Genome Instability and Repair, Keystone Meeting, Breckenridge, CO
(09/17/07-09/22/07)
11. Using computational knot theory to study chromosome organization in bacteriophages
Workshop on Topological Methods in Combinatorics, Computational Geometry, and the Study of Algorithms
Mathematical Sciences Research Institute (MSRI), Berkeley, CA (10/02/06-10/06/06)
10. Poster: Chromosome Clustering in Human Fibroblasts
50 Years of 46 Human Chromosomes: Progress in Cytogenetics
National Institutes of Health, Bethesda, MD 2006
9. Poster: Computer modelling by Type II topoisomerases
RECOMB 04, San Diego, CA 2004
8. Poster: MFISH and computer analysis of radiation induced chromosome aberrations in human cells shows evidence that non-homologous end joining dominates homologous recombination during G0/G1
Keystone Symposia: Molecular Mechanisms of DNA Replication and Recombination
Snowbird, UT. 2002
7. Poster: Computer Simulations Suggest an Early form of Instability in Irradiated Human Lymphocytes
RECOMB 2001, Montreal, Canada, 2001
6. Oral Presentation: DNA packing in bacteriophage P4
19th Annual Meeting of the American Society for Virology. Fort Collins, CO, 2000
5. Poster: The packing of DNA in viral capsids
Quantitative Challenges in the post-genomic sequence era. San Diego, CA, 2000
4. Poster: Exploring DNA conformations in confined volumes. Monte-Carlo and Structure Optimization Methods for Biology, Chemistry, and Physics. Tallahassee, FL, 1999
3. Poster: Analyzing DNA knots from viral capsids
Mathematics and Molecular Biology IV, Santa Fe, NM, 1999
2. Poster: DNA packing in bacteriophages
Doing Science at the interface, a workshop, Berkeley, CA, 1998
1. Oral Presentation: Modeling Viral DNA Packaging in Capsids
Second National SIAM Student Conference, Tallahassee, FL, 1998

TEACHING EXPERIENCE IN MATHEMATICAL/COMPUTATIONAL BIOLOGY

- 2008 Topology of DNA
Mathcamp (1 week (15 hours) summer course)
(Canada/USA Mathcamp is an intensive five-week-long summer program for high-school students interested in mathematics.)
Reed College, Portland, OR 2008
- 2007 Topology of DNA (MATH 490/890)
Mathematics Department, San Francisco State University (Spring)
Designed and taught jointly with Prof. Vazquez.
- 2007 Modern mathematical methods in Biology (MATH 890)
Mathematics Department, San Francisco State University (Spring)
Designed and taught jointly with Prof. Vazquez
- 2006 Individual study (MATH 669)
Applied Mathematics Project (Math696)
Mathematics Department, San Francisco State University (Spring)
Designed and taught
- 2003 Analyzing DNA topology and geometry with mathematical and computational methods.
Mathematics Department, UC Berkeley.
Designed and taught jointly with Dr. Vazquez.
- 2002 Analysis of microarray data.
Graduate course: Individual research
Mathematics Department, UC Berkeley (Spring)
Designed and taught
- 2000-02 Undergraduate Research Apprentice Program (URAP)
UC Berkeley's Dean Office
I mentored a total of six undergraduate students from different departments.
four of them went to graduate school (see section undergraduate research for details).
- 1999 DNA Topology. (2 lectures, 2 computer laboratory sessions)
VI Summer School, CIMAT, Guanajuato, Mexico
Designed and taught

TEACHING EXPERIENCE IN MATHEMATICS

- 2009 Complex Analysis (1 Section, Spring)
Topology (1 Section, Fall)
- 2008 Mathematical Modeling (1 Section, Spring)
- 2007 Ordinary Differential Equations (1 Section, Fall)
- 2006 Calculus I (1 Section, Spring)
Numerical Analysis (1 Section, Spring)
- 2005 Calculus I (2 sections, Lecture class, Fall)
- 1996 Precalculus for Business (Recitation class, Spring),
Analytic Trigonometry (Lecture class, Summer, Fall)
Mathematics Department, Florida State University
- 1995 Linear Algebra (Recitation class, Spring)
Mathematics Department, Zaragoza University, Spain
College Algebra (Recitation class, Fall)
Mathematics Department, Florida State University
- 1994 Linear Algebra (Recitation class, Fall)
Mathematics Department
Zaragoza University, Spain

STUDENT RESEARCH

CURRENT STUDENTS

Wenjing Zheng (MA, Mathematics UCB); Wen Jenny Shi (MA, Mathematics SFSU); Alexander Pankov (Undergraduate, Mathematics SFSU); Katrina Wono (Extended Learning Student, Mathematics), John Collins (MA, Computer Science, SFSU)

FORMER STUDENTS AND NON-THESIS GRADUATE STUDENTS (Since 2005)

Nasheen Mirza (Postbac, Open University Student, Fall 05, Spring 06); Yunha Chae (Senior, CS, Fall 05, Spring 06, Fall 06- Now MA student as SJSU); Oswaldo Lon (Senior, CS, Spring 06, Fall 06- Now MA student as SJSU) ; Xiaou Hu (Senior, CS, Spring 06, Fall 06-Now Software Engineer, IBM China Global Delivery Chengdu Center); Dane Volek (Junior Math, Fall 07- Undergraduate in Mathematics); Stacey Hubbard, (Grad. student Mathematics, Fall 06); Jupei Hsiao (Graduate, Mathematics, Summer and Fall 07); Trevor Blackstone (Undergraduate, CS from Summer 06 to Summer 08; Now MS in CS at SFSU); Benjamin Borgo (Spring 08-Summer09; Undergraduate, Mathematics; Now PhD student in Computational Biology Washington University)

HONORS THESIS DIRECTED

2003 Megan McClean; undergraduate honors thesis (Mathematics, UC Berkeley).
Title: Functional genomics study of *Escherichia coli* responses to DNA double strand breaks induced by SwaI restriction enzyme.

MASTERS THESIS DIRECTED

Ari Arkerstein (Biology, Summer 08), Lawrence Varela (Computer Science, Summer 08), Daniel Dewoskin (Mathematics, Spring 09)

ABSTRACTS PUBLISHED WITH STUDENTS

3. Blackstone, T.* , Diao, Y. and Arsuaga, J. Linking of Chromosomes During Interphase (Proceedings of RECOMB 07).

2. Arkerstein, A., Bernstein, D. and Arsuaga, J. (2007) An in silico approach to analyzing nuclear FRAP protein recovery curves using an extension of the Gillespie algorithm. *Biochemistry and Cell Biology* 85(4)

1. Hu, X.* , Chae, Y.* , Lon, O.* , Climent, J. and Arsuaga, J. (2007) Analysis of CGH Breast Cancer Data using Algebraic homology groups *Biochemistry and Cell Biology* 85(4)

* indicates undergraduate student

Publications with students are included below

More details about student's awards and presentations can be found at http://math.sfsu.edu/arsuaga/undergraduate_research.html

MENTORING OF POSTDOC and STAFF

CURRENT POSTDOC

Robert Scharein

RESEARCH TECH

Daniel DeWoskin, Tex Kaplan

SERVICE TO THE DEPARTMENT/PROFESSION/SOCIETY

REFEREE FOR THE FOLLOWING JOURNALS

Acta Biotheoretica (1), Bioinformatics (2), Proc. Natl. Acad. Sci USA (1), Radiation Research (2), Journal of Theoretical Biology (1), International Journal of Radiation Biology (1), Biophysical Journal (1), Bulletin of Mathematical Biology (2), Journal of Mathematical Biology (1)

PANELIST

NSF-DMS(1), UCSF panel "Preparing Future Faculty: Academic Job Search Symposium" (2008), CSUPERB grant panel review (2009)

JUDGE

CoSE Showcase poster session 2008.

CONFERENCE ORGANIZATION

2010 New Trends in Mathematical Biology, SIAM mini-symposium at the Joint AMS-MAA-SIAM meeting. Co-organizers: M. Vazquez (SFSU)

2009 1st San Francisco International Conference on DNA topology (and 1049 AMS meeting), UCSF and SFSU. Co-organizers: K. Millet (UCB), R. Scharein (SFSU) and M. Vazquez (SFSU).

2008 BaMBA Day IV: (Biology and Mathematics in the Bay Area, at UC Davis. Chair: Patrice Koehl (UCD). Co-organizers: H. Moore (Genentech), M. Levitt (Stanford), J. Stuart (UCSC)

2006 BaMBA Day II: (Biology and Mathematics in the Bay Area, held at the Mathematical Sciences Research Institute, MSRI). I was chair of the organizing committee. Co-organizers: Richard Karp (UCB), Sami Khuri (SJSU), Patrice Koehl (UCD), Bernd Sturmfels (UCB)

2005 BaMBA Day I: (Biology and Mathematics in the Bay Area, San Francisco State University). Coorganizers: Mariel Vazquez (SFSU), Serkan Hosten (SFSU) and Bernd Sturmfelds (UCB). Over 100 participants from different institutions private and public from around the Bay Area and California attended the event.

SEMINAR ORGANIZATION

2007 One day retreat. SFSU Chromatin Club

2006-2007 Spring Joint Mathematics and Biology Journal Club in Chromatin Structure (see <http://online.sfsu.edu/~pasion/chromatin.htm>)

2005 Joint SFSU-UCB Math-Biology Seminar for undergraduates (Co-organizers: R.K. Sachs and Mariel Vazquez)

2005-2006 Math-biology Seminar (co-organizers: Mariel Vazquez and Serkan Hosten)

2002-2003 UC Berkeley Undergraduate Seminar in Mathematical Biology (Co-organizers: R.K. Sachs and Mariel Vazquez)

COMMITTEES AT SFSU

2005-2007 Committee to design a new calculus series for biology students
2006-2007 Graduate Committee of the Mathematics Department

MASTERS COMMITTEE AT SFSU

Candice Price (Mathematics department SFSU, Fall 2006); Elinor Velasquez (Biology SFSU, Summer 2008)

PROFESSIONAL SOCIETIES

American Association for the Advancement of Science (2007-Present)
American Society for Virology, ASV, (2000-Present)
International Society for Computational Biology, ISCB. (2001-2005)
Society of Industrial and Applied Mathematics, SIAM. (1999-2000; 2004)
American Mathematical Society, AMS (1995-2000)

PERSONAL INFORMATION

NATIONALITY

Spanish, US Permanent Resident

MARITAL STATUS

Married to Mariel with one daughter Eithne and one son Cedric

PUBLICATIONS

The list of publications contains a total of 25 publications. Two of these are book chapters and one is a conference proceeding.

Five publications have been reviewed in Faculty of 1000 and one has been catalogued as a highly accessed paper. (Faculty of 1000 is a new online research tool that highlights the most interesting papers in biology, based on the recommendations of over 1000 leading scientists. More information can be found at <http://www.facultyof1000.com/start.asp>)

My current **H-Index is at least 9** (H index is the number H of publications that have been cited more than H-times). More details about the publications and links to the list of citations can be found at <http://math.sfsu.edu/arsuaga/publications1.html>.

Number of citations in each paper last updated Fall 09

Several publications include undergraduate students as coauthors.

Papers on radiation cytogenetics/chromosome aberrations:

8. DeWoskin, D., Climent, J., Cruz-White, I., Vazquez, M., Park, C. and Arsuaga, J.
Applications of Computational Homology
to Prediction of Treatment Response in Breast Cancer Patients.
(In Press) Topology and Its Applications.

[Developed a new method to analyze CGH data from cancer patients]

7. Climent, J., Mao, J., Garcia, J. L., **Arsuaga, J.**, Perez-Losada, J. Characterization of Breast Cancer by Array CGH. *Biochemistry and Cell Biology* (2007) 85(4); 497-508

[Review current advances in CGH and breast cancer]

Cited: 9 times

6. Vives, S., Bradford, L., Vazquez, M., Brenner, D., Sachs, R. K., Hlatky, L., Cornforth, M. and **Arsuaga, J.** (2005) SCHIP: Statistics of Chromosome Interphase Positioning based on interchange data. *Bioinformatics* 21(14):3181-2. [We have created an interactive public data base to test for chromosome proximity. Based on work from publications 2 and 4]

Cited: 1 time

5. Levy, D., Vazquez, M., Loucas, B. D., Cornforth, M. N., Sachs, R. K., **Arsuaga, J.** (2004) Comparing DNA damage-processing pathways by computer analysis of chromosome painting data. *Journal of Computational Biology* 11(4): 626-641.

[We use computer simulations of aberration mechanisms and graph theory to show that cyclic graphs discriminate between pathways of aberration formation]

Cited: 7 times

4. **Arsuaga, J.**, Greulich-Bode, K., Vazquez, M., Bruckner, M., Hahnfeldt, P., Brenner, D. J., Sachs, R. and Hlatky, L. (2004) Chromosome positioning through radiogenic aberrations. *International Journal of Radiation Biology* 80 (7), 507-516. [We use a new statistical method combined with computer simulations and experiments to show that radiation induced chromosome aberrations detect the clusters of chromosomes {1,16,17,19,22} and {13,14,15,21,22} and that chromosome sensitivity is proportional to (DNA content)^{2/3}]

Cited: 15 times

3. Vazquez, M., Greulich-Bode, K. M., **Arsuaga, J.**, Cornforth, M. N., Bruckner, M., Sachs, R. K., Hahnfeldt, P., Molls, M., Hlatky, L. (2002) Computer analysis of mFISH chromosome aberration data uncovers an excess of very complex metaphases. *International Journal of Radiation Biology* 2002, 78(12): 1103-1115. [We combined mFISH data and computer simulations to propose a new radiation induced chromosome aberration mechanism inspired in an early form of chromosome instability].

Cited: 13 times

2. Cornforth, M. N., Greulich-Bode, K. M., Loucas, B. D., **Arsuaga, J.**, Vazquez, M., Daye, J., Sachs, R. K., Bruckner, M., Molls, M., Hahnfeldt, P., Hlatky, L., Brenner, D. J. (2002) Chromosomes are predominantly located randomly with respect to each other in interphase human cells. *The Journal of Cell Biology* 159 (2), 237-244.

Commented by Alan W. Dove (2002) Chromosomal clickes. *The Journal of Cell Biology* 159 (2), 199.

Evaluated by Prof. M. Matzke (Austrian Academy of Sciences, Austria) in Faculty of 1000

[We present a new statistical method combined with computer simulations to show that radiation induced chromosome aberrations can detect clusters of chromosomes and that chromosome sensitivity is proportional to (DNA content)^{2/3}]

Cited: 51 times

1. Sachs, R. K., **Arsuaga, J.**, Vazquez, M., Hahnfeldt, P., and Hlatky, L. (2002) Using graph theory to analyze chromosome aberrations. *Radiation Research* **158** (5): 556-567. [We developed the concept of aberration multigraph. A mathematical framework that classifies chromosome aberrations, allows to prove formal statements about aberrations and to develop new algorithms to compute the cycle structure of an aberration].

Cited: 7 times

Papers on chromosome structure, DNA topology and polymer models:

17. **Arsuaga, J.**, Borgo*, B., Diao, Y. and Scharein, R. The Average Crossing Number of Equilateral Random Polygons in Confined Volumes. (In Press J. Phys A)

16. Scharein,R., Ishihara,K., **Arsuaga,J.**, Shimokawa, K., Vazquez, M. Bounds for minimal step number of knots in the simple cubic lattice. (In Press J. Phys A).

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