Julián Candia, Ph.D.

Address: Center for Human Immunology,
Autoimmunity and Inflammation, NIH,
10 Center Drive, Building 10, Room 7N115,
Bethesda, MD 20892, USA

Citizenships: USA, Argentina
Phone: +1 (240) 292-4402
Email: julian.candia@nih.gov
Web: www.juliancandia.com

EDUCATION

- 2000 – 2004: **Ph.D. in Physics** at University of La Plata (Argentina). Thesis: *Propagation of High Energy Galactic Cosmic Rays*, passed with the maximum score (10).
- 1993 – 1999: Licenciado en Física (approx. equivalent to B.Sc. + M.Sc.) at University of La Plata (Argentina). Cumulative GPA 9.57 (out of 10 max.).

PROFESSIONAL SKILLS & EXPERTISE RELEVANT TO BIOMEDICAL INFORMATICS

- Highly productive and creative with **40+** peer-reviewed research articles (see list below).
- Very strong problem solving skills, versatility, and ability to learn quickly.
- Excellent team working ability and strong communication and presentation skills developed in different research groups in the USA, Europe and South America.
- 2 yrs Technical Services Engineer with leading EHR vendor Epic Systems Corp.
- Sun Certified Programmer for Java 6 (2008); long programming experience with Fortran77, R, Perl, Python; familiar with Unix, Mac OS X, Windows, and many numerical applications.
- Extensive experience in computational and theoretical modeling: Monte Carlo method, partial differential equations, complex network theory, data mining, SVD/PCA/tSNE.

RESEARCH INTERESTS

- Biomedical Informatics and Biocomputing applied to human immunology, cancer systems biology, single-cell biology, next-generation sequencing, high-multiplex proteomics.
- Statistical analysis and modeling, biomedical database integration, data mining, complex network science applied to systems biology.

CAREER HISTORY

- Since 9/2014: Staff Scientist at the Trans-NIH Center for Human Immunology, Autoimmunity and Inflammation, National Institutes of Health (Bethesda, MD).
- 2011- 2014: Research Associate at University of Maryland (College Park & Baltimore, MD).
- 2009 – 2011: EHR Technical Services Engineer at Epic Systems Corp (Verona, WI).
- 2008 – 2014: Research Scientist (Tenured Position) at CONICET (Argentina).
- 2006 – 2008: Postdoctoral Research Associate at the Center for Complex Network Research (Barabási Lab) at Notre Dame (South Bend, IN) and Northeastern University (Boston, MA)
- 2006: Visiting Scientist at University of New Mexico (Albuquerque, NM).
- 2004 - 2005: Postdoctoral Fellow at the ICTP (Trieste, Italy).
- 2004: Guest Scientist at the Theory Division of Fermilab (Chicago, IL).
- 2000 – 2003: Ph.D. Fellow of CONICET (Argentina).
- 1996 – 2003: Teaching Assistant at the Physics Dept, University of La Plata (Argentina).

PUBLICATIONS IN REFEREED JOURNALS (BIOMEDICAL INFORMATICS)

51) Candia J, Tsang JS (2018) *eNetXplorer: an R package for the quantitative exploration of elastic net families for generalized linear models*. bioRxiv 305870 (under review).

50) Shen Y, Kubben N, Candia J, Morozov AV, Misteli T, Losert W (2018) *RefCell: Multi-dimensional analysis of image-based high-throughput screens based on 'typical cells'*. bioRxiv 325415 (under review).

49) Ciucci T, Vacchio MS, Gao Y, Tomassoni Ardori F, Candia J, Mehta M, Zhao Y, Tran B, Pepper M, Tessarollo L, McGavern DB, Bosselut R (2018) *Early differentiation and functional fitness of memory CD4+ T cells require the transcription factor Thpok* (under review).

48) Brown D, Zingone A, Yu Y, Zhu B, Candia J, Cao L, Ryan BM (2018) *Relationship between circulating inflammation proteins and lung cancer diagnosis in the National Lung Screening Trial* (under review).

47) Giudice V, Gao S, Candia J, Kajigaya S, Young NS, Biancotto A (2018) *Fluorescent Cell Barcoding of Whole Blood for Granulocyte and Monocyte Phenotyping Shows High Variability by Conventional and Computational Analyses* (under review).

46) Chen J, Cheung F, Shi R, Zhou H, Lu W, CHI Consortium (2018) *PBMC Fixation and Processing for Chromium Single-Cell RNA Sequencing*. Journal of Translational Medicine (in press).

45) Tanaka T, Biancotto A, Moaddel R, Moore Z, Gonzalez-Freire M, Aon MA, Candia J, Zhang P, Cheung F, Fantoni G, CHI consortium, Semba RD, Ferrucci L (2018) *Plasma proteomic signature of age in healthy humans*. Aging Cell e12799.

44) Candia J, Cheung F, Kotliarov Y, Fantoni G, Sellers B, Griesman T, Huang J, Stuccio S, Zingone A, Ryan BM, Tsang JS, Biancotto A (2017) *Assessment of Variability in the SOMAscan Assay*. Scientific Reports 7:14248.

43) Cheung F, Fantoni G, Conner M, Sellers BA, Kotliarov Y, Candia J, Stagliano K, Biancotto A (2017) *Web Tool for Navigating and Plotting SomaLogic ADAT Files*. Journal of Open Research Software 5:20.

42) Dolatabadi S, Candia J, Akrap N, Vannas C, Tomic TT, Losert W, Landberg G, Åman P, Ståhlberg A (2017) *Cell cycle and cell size dependent gene expression reveals distinct subpopulations at single-cell level*. Frontiers in Genetics 8:1.

41) Lau WW, Sparks R, OMiCC Jamboree Working Group, Tsang JS (2016) *Meta-analysis of crowdsourced data compendia suggests pan-disease transcriptional signatures of autoimmunity [version 1; referees: 2 approved]*. F1000Research 5:2884.

40) Chen D, Sarkar S, Candia J, Florczyk SJ, Bodhak S, Driscoll MK, Simon Jr CG, Dunkers JP, Losert W (2016) *Machine learning based methodology to identify cell shape phenotypes associated with microenvironmental cues*. Biomaterials 104:104-118.

39) Candia J, Cherukuri S, Guo Y, Doshi KA, Banavar JR, Civin CI, Losert W (2015) *Uncovering low dimensional, miR-based signatures of acute myeloid and lymphoblastic leukemias with a machine-learning-driven network approach*. Convergent Science Physical Oncology 1:025002.

38) Goswami M, McGowan KS, Lu K, Jain N, Candia J, Hensel NF, Tang J, Calvo KR, Battiwalla M, Barrett AJ, Hourigan CS (2015) *A novel multi-gene array allows relapse risk stratification in acute myeloid leukemia patients undergoing stem cell transplantation*. Bone Marrow Transplantation 1-10.

37) Candia J, Banavar JR, Losert W (2014) *Understanding Health and Disease with Multidimensional Single-Cell Methods*. J Phys: Condens Matter 26:073102.

36) Candia J, Maunu R, Driscoll M, Biancotto A, Dagur P, McCoy Jr JP, Sen HN, Wei L, Maritan A, Cao K, Nussenblatt RB, Banavar JR, Losert W (2013) *From Cellular Characteristics to Disease Diagnosis: Uncovering Phenotypes with Supercells*. PLoS Computational Biology 9:e1003215.

OTHER PUBLICATIONS IN REFEREED JOURNALS

35) Mazzitello KI, Candia J, Albano EV (2015) *Far-from-equilibrium growth of magnetic thin films with Blume-Capel impurities*. Physical Review E 91:042118.

34) Baglietto G, Albano EV, Candia J (2014) *Complex network structure of flocks in the Vicsek Model with Vectorial Noise*. Int J Mod Phys C 25:1350095.
33) Baglietto G, Albano EV, Candia J (2013) *Complex network structure of flocks in the Standard Vicsek model*. J Stat Phys 153:270.
32) Baglietto G, Albano EV, Candia J (2013) *Gregarious vs Individualistic Behavior in Vicsek Swarms and the Onset of First-Order Phase Transitions*. Physica A 392:3240.
31) Loscar ES, Candia J (2013) *Stochastic Resonance and Dynamic First-Order Pseudo-Phase Transitions in the Irreversible Growth of Thin Films under Spatially Periodic Magnetic Fields*. Phys Rev E 88:042412.
30) Candia J, Albano EV (2012). *Nonequilibrium critical behavior of magnetic thin films grown in a temperature gradient*. J Stat Mech: Theor Exper P08006.
29) Baglietto G, Albano EV, Candia J (2012) *Criticality and the onset of ordering in the Standard Vicsek Model*. Interface Focus 2:708.
28) Mazzitello K, Candia J (2012) *Diffusion-based density-equalizing maps: an interdisciplinary approach to visualizing homicide rates and other georeferenced statistical data*. Braz J Phys 42: 365.
27) Candia J, Albano EV (2011) *Far-from-equilibrium growth of thin films in a temperature gradient*. Phys Rev E 84:050601 (R).
26) Candia J (2009) *Advertising and irreversible opinion spreading in complex social networks*. Int J Mod Phys C 20:799.
25) Candia J, Albano EV (2008) *The magnetic Eden model*. Int J Mod Phys C 19:1617.
24) Candia J, Mazzitello K (2008) *Mass media influence spreading in social networks with community structure*. J Stat Mech: Theor Exper P07007.
23) Parris PE, Candia J, Kenkre VM (2008) *Random walk access times on partially-disordered complex networks: an effective medium theory*. Phys Rev E 77:061113.
22) Candia J, M.C. González, P. Wang, T. Schoenharl, G. Madey, A.-L. Barabási (2008) *Uncovering individual and collective human dynamics from mobile phone records*. J Phys A 41:224015.
21) Candia J (2007) *Nonequilibrium opinion spreading on 2D small-world networks*. J Stat Mech: Theor Exper P09001.
20) Candia J, Parris PE, Kenkre VM (2007) *Transport properties of random walks on scale-free/regular-lattice hybrid networks*. J Stat Phys 129:323.
19) Mazzitello K, Candia J, Dossetti V (2007) *Effects of mass media and cultural drift in a model for social influence*. Int J Mod Phys C 18:1475.
18) Candia J (2007) *Irreversible opinion spreading on scale-free networks*. Phys Rev E 75:026110.
17) Candia J (2006) *Irreversible growth of binary mixtures on small-world networks*. Phys Rev E 74:031101.
16) Manías V, Candia J, Albano EV (2005) *Corner wetting in a far-from-equilibrium magnetic growth model*. Eur Phys J B 47:563.
15) Candia J (2005) *Detectable neutrino fluxes due to enhanced cosmic ray densities in the Galactic Centre region*. J Cosmol Astrop Phys 11:002.
14) Beacom JF, Candia J (2004) *Shower power: isolating the prompt atmospheric neutrino flux using electron neutrinos*. J Cosmol Astrop Phys 11:009.
13) Candia J, Roulet E (2004) *Diffusion and drift of cosmic rays in highly turbulent magnetic fields*. J Cosmol Astrop Phys 10:007.
12) Candia J, Roulet E (2003) *Rigidity dependent knee and cosmic ray induced high energy neutrino fluxes*. J Cosmol Astrop Phys 09:005.
11) Candia J, Mollerach S, Roulet E (2003) *Cosmic ray spectrum and anisotropies from the knee to the second knee*. J Cosmol Astrop Phys 05:003.
10) Candia J, Albano EV (2003) *Order-disorder criticality, wetting, and morphological phase transitions in the irreversible growth of far-from-equilibrium magnetic films*. J Magn Magn Mater 260:338.

9) Candia J, Roulet E, Epele LN (2002) *Turbulent diffusion and drift in galactic magnetic fields and the explanation of the knee in the cosmic ray spectrum*. J High E44nergy Phys 12:033.
8) Candia J, Mollerach S, Roulet E (2002) *Cosmic ray drift, the second knee and galactic anisotropies*. J High Energy Phys 12:032.
7) Candia J, Albano EV (2002) *Quasi-wetting and morphological phase transitions in confined far-from-equilibrium magnetic thin films*. J Chem Phys 117:6699.
6) Candia J, Albano EV (2002) *Interfacial phase transitions in a far-from-equilibrium magnetic growth model*. J Phys: Condens Matter 14:4927.
5) Candia J, Epele LN, Roulet E (2002) *Cosmic ray photodisintegration and the knee of the spectrum*. Astrop Phys 17:23.
4) Candia J, Albano EV (2001) I*rreversible growth of a binary mixture confined in a thin film geometry with competing walls*. Phys Rev Lett 88:016103.
3) Candia J, Albano EV (2001) *Monte Carlo simulation of the irreversible growth of magnetic thin films*. J Appl Phys 90:5395.
2) Candia J, Albano EV (2001) *Comparative study of an Eden model for the irreversible growth of spins and the equilibrium Ising model*. Phys Rev E 63:066127.
1) Candia J, Albano EV (2000) *Non-equilibrium wetting transition in a magnetic Eden model*. Eur Phys J B 16:531.

BOOK CHAPTERS

2) Candia J, Banavar J, Losert W (2015) *Uncovering Phenotypes with Supercells: Applications to Single-Cell Sequencing*. In: Wang X (Ed), *Single Cell Sequencing and Systems Immunology*, Translational Bioinformatics (Vol. 5), ISBN 978-94-017-9752-8, ISBN 978-94-017-9753-5 (eBook), Springer, Chapter 2.
1) Pawling A, Yan P, Candia J, Schoenharl T and Madey G (2010) *Anomaly detection in streaming sensor data*. In: Cuzzocrea A (Ed), *Intelligent Techniques for Warehousing and Mining Sensor Network Data*, DOI: 10.4018/978-1-60566-328-9 IGI Global – Hershey, PA.

SOFTWARE

Candia J, Tsang JS (2018) eNetXplorer. R package available under GPLv3 license at https://CRAN.R-project.org/package=eNetXplorer

INVITED AND CONTRIBUTED TALKS (2012 onwards)

- *Nonlinear Mixed-Effects Modeling of Proteomics Antibody-Based Multiplex Assays: A Bioinformatics Post-Hoc Approach to Improve Signal-to-Noise Ratios*. ISMB/ECCB Conference, Prague, 07/25/2017.
- *Meta-Analysis of CHI's SOMAscan Data: Assessing Variability, Reproducibility, and Reusability*. 1st SOMAscan Users Workshop. Center for Human Immunology, NIH, 03/27/2017.
- *Flow Cytometry Bioinformatics*. Notable Labs, 01/11/2017.
- *Exploring Protein Biomarkers with the SOMAscan Assay: From Wet-Lab to Bioinformatics*. Icahn School of Medicine at Mt. Sinai, 8/24/2016.
- *SomaLogic SOMAscan proteomics assay* (co-presented with A. Biancotto) in the "Genomics and Immunology Science Brown Bag Series", Clinical Genomics Program, NIAID, NIH, 3/09/2016.
- *Machine learning algorithms for flow cytometry analysis of human disease*. Institute of Inflammation and Ageing Seminar, University of Birmingham (UK), 11/17/2015.
- *Unbiased Learning from Big Data: Multidimensional Approaches for Data-Driven Biomedical Research*. Division of Biostatistics and Bioinformatics, University of Maryland (Baltimore), 06/24/14.
- *Unbiased Learning from Big Data: Multidimensional Approaches for Data-Driven Biomedical Research*. "Applied Dynamics Seminar" series, University of Maryland (College Park), 04/24/14.

- *Uncovering Differential Multi-microRNA Signatures of Acute Myeloid and Lymphoblastic Leukemias with a Machine-Learning-Based Network Approach*. "2014 Joint Summits on Translational Science", American Medical Informatics Association (AMIA), 04/07-11/14, San Francisco.
- *A novel multi-gene expression array allows relapse risk stratification in acute myeloid leukemia patients undergoing allogeneic hematopoietic stem cell transplantation*. Invited talk, Leukemia Biology Section, Genetics Branch, NCI/NIH (Bethesda), 03/21/14.
- *Uncovering Multidimensional miR and Gene Expression Signatures of Acute Leukemias with Machine-Learning-Based Approaches*. T32 Cancer Biology Research in Progress Seminar, UMB School of Medicine, Baltimore, 01/28/2014.
- *Unbiased Learning from Big Data: Multidimensional Approaches for Data-Driven Biomedical Research*. Invited Talk at the Innovation Center for Biomedical Informatics, Georgetown University, 13/12/13.
- *From molecules to cells to organisms: understanding health and disease with multidimensional single-cell methods*. Invited Talk at the American Physical Society March Meeting, Baltimore, 03/21/2013.
- *Unbiased Learning from Big Data: Applications to Cancer Biology*. T32 Cancer Biology Research in Progress Seminar, UMB School of Medicine, Baltimore, 02/13/2013.
- *Solving the Puzzle of Cell Heterogeneity vs Disease Phenotype with Supercells*. Invited talk at the UMD-NCI Cancer Technology Workshop, UMD, College Park, 01/18/2013.
- *Cell Averaging and Classification of Multidimensional Single-Cell Data: Solving the Puzzle of Heterogeneity vs Disease Phenotype with Supercells*. Pacific Symposium on Biocomputing 2013, Kona (HI), 01/03/2013.
- *From Molecules to Cells to Organisms: Understanding Health and Disease with Multidimensional Single-Cell Methods*. 3rd Annual Cancer Biology Retreat, University of Maryland, Baltimore, 05/22/2012.
- *Uncovering Cell Subpopulations in Health and Disease: a Network Analysis of Multidimensional Single-Cell Data*. FOCIS-CHI Lecture Series "Bedside to Bench and Back", NIH, Bethesda, 03/21/2012.

CONFERENCES, MEETINGS AND SYMPOSIA ATTENDED (2012 onwards)

• International Society for Computational Biology's Annual ISMB/ECCB Conference, Prague, 7/21-25/2017.
• 1st SOMAscan Users Workshop. Center for Human Immunology, NIH, 03/27/2017.
• 4th International Workshop on Systems approaches in immunology and infectious diseases, Santa Fe, NM, 9/27-28/2016.
• 30th NIH Research Festival, 9/14-16/2016.
• 2016 Symposium on Influenza Immunology: Data, Systems and Models, Yale University, New Haven, CT, 6/24/2016.
• Keystone Symposium on "Systems Immunology: From molecular networks to human biology", Big Sky, MT, 1/10-14/2016.
• 29th NIH Research Festival, 9/16-18/2015.
• 13th NHLBI's Division of Intramural Research Festival, 6/12/2015.
• 2015 Symposium on Immune Modeling in the Big Data Era, Center for Biodefense Immune Modeling, University of Rochester, 6/4-5/2015.
• 2014 Joint Summits on Translational Science, AMIA, San Francisco, 04/07-11/2014.
• 5th Annual Physical Sciences in Oncology Public Meeting, NIH, Bethesda, 04/02/2014.
• 2014 Cancer Technology & Epidemiology Symposium, UMD, College Park, 01/23/2014.
• 6th Annual Maryland Stem Cell Research Symposium, Johns Hopkins, 12/03/2013.
• Bioscience Day: From DNA to Cellular Function, UMD, College Park, 11/19/2013.
• 3rd Annual Stem Cell Retreat, University of Maryland School of Medicine, 10/18/2013.
• 2nd Annual Biomedical Informatics Symposium, Georgetown University, 10/11/2013.

- ACM Conference on Bioinformatics, Computational Biology and Biomedical Informatics, Bethesda, 09/22-25/2013.
- Annual Single Cell Analysis Investigators Meeting, Bethesda, 04/15-16/2013.
- American Physical Society's 2013 March Meeting, Baltimore, 03/18-22/2013.
- UMD-NCI Cancer Technology Workshop, UMD, College Park, 01/18/2013.
- Pacific Symposium on Biocomputing 2013, Kona (HI), 01/03-07/2013.
- New Frontiers in Physical Sciences and Oncology, N.I.H., Bethesda, 12/10/2012.
- 3rd Annual Cancer Biology Retreat, University of Maryland, Baltimore, 05/22/2012.
- The NIH Common Fund Single Cell Analysis Workshop, Bethesda, 04/17-18/2012.

COURSES ATTENDED (2012 onwards)

- Genomic Data Science Specialization (online) by Johns Hopkins University consisting of 7 online courses offered through www.coursera.org, passed 7/28-12/12/2016.
- Advanced Course in Basic & Clinical Immunology, Federation of Clinical Immunology Societies (FOCIS), Scottsdale, AZ, 2/03-06/2016.
- Genomics Workshop, Institute for Genome Sciences, University of Maryland (Baltimore), 06/03-07/2013.
- Advanced Cancer Biology (GPLS 790), Graduate Program in Life Sciences, University of Maryland (Baltimore), Spring Semester (01/23-05/17/2013).
- Scientific Leadership & Professional Development Symposium for Basic Science and Translational Researchers, University of Maryland (Baltimore), 04/24/2013.
- Research Ethics (CIPP 907), University of Maryland (Baltimore), 2012/2013.
- Responsible Conduct of Research training, University of Maryland (College Park), 12/13/2012.
- Conflicts of Interest (CIPP 909), University of Maryland (Baltimore), 2012.

OTHER SKILLS, ACHIEVEMENTS & INTERESTS

- Fluent in Spanish (mother tongue), English and Italian.
- Referee for Bioinformatics, PLoS One, J. Translational Medicine, Cytometry Part A, Journal of the Royal Society Interface, Nature Communications, AMIA Translational Bioinformatics and AMIA Joint Summits on Translational Science.
- Formerly, Referee for Phys. Rev. Lett., Phys. Rev. E , Int. J. Mod. Phys. B, Int. J. Mod. Phys. C, Physica A, Phys. Lett. A,
- Award "Dr. J.V. González" for highest GPA from the University of La Plata (2000).