

# Simon Carrignon

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## Professional Experience

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### Research Positions

#### McDonald Institute for Archaeology, University of Cambridge

Cambridge, UK

*Research Associate*

*Actual position (since May. 2021)*

Studying spatial patterns of cultural variation during the Jomon-Yayoi transition to infer evolutionary changes in cultural interconnectivity and the presence/absence of cultural boundaries. ERC project ENCOUNTER

#### DySoC/NIMBioS/Anthropology/School of Information Science, UT

Knoxville, TN

*Postdoctoral fellow*

*Dec. 2019 – Mar. 2021*

Working with DySoC faculty members to explore and testing the role of social learning strategies in human cooperation and cultural change across the ages.

#### Barcelona Supercomputing Center

Barcelona, Spain

*Predoctoral Researcher*

*Jan. 2015–Jan. 2019*

Predocotrual researcher at the Barcelona Supercomputing Center (BSC) working for the ERC project EPNET (ERC-2013-ADG 34082). Main tasks: development, test and simulation of new model on supercomputing environment. Data analysis and visualisation. Test and validation of theoretical model against archaeological and historical data.

#### LUTIN-Université Paris 8

Paris, France

*Research engineer*

*Jan. 2010–Mar. 2012*

1 week to 3 months short contracts: modeling, data processing & statistical analysis.

### Teaching Positions

#### University of Cambridge

Cambridge, UK

*Supervisor*

*Michaelmas 2023, Lent 2024*

Supervision for paper A11 - From Data to Interpretation, undergraduate students.

#### University of Cambridge

Cambridge, UK

*Supervisor*

*Lent 2023*

Supervision for paper B13 - Cultural Evolves, undergraduate students.

#### Université Paris Dauphine

Paris, France

*Junior Lecturer (Chargé de cours)*

*Sept. 2011–Jan. 2012*

Course for 2nd yr. university students. Total amount of teaching: 36hr.

Elementary notions of algorithmic and databases manipulation (w/ Foxpro).

#### Université Paris 8

Paris, France

*Junior Lecturer (Chargé de cours)*

*Sept. 2010–Jan. 2012*

Course for undergraduate students (License Students). Total amount of teaching: 144hr.

C2I course – teaching of office tools (open source version of Word, Excel, PPT) & general knowledge of computers (software/hardware/network).

### Research Stays

#### University of Trento

Trento, Italy

*Visiting Scholar*

*January 2024*

10 visiting scholar with professor Alberto Acerbi. Design and exploration of chain experiments with Large Language Models, funded by Turing Institute.

#### NIMBIOS-University of Tennessee

Knoxville, USA

*Visiting Scholar*

*June 2018*

One month visiting scholar with professor Alex Bentley. Development of models of spread of information on online social media. Validation of the models against datasets using Approximate Bayesian Computation. R-package and vignette available: [@git](#)

**LORIA**

**Nancy, France**

*Visiting Student*

*May 2010*

One week stay in the team of Olivier Simonin. Technical configuration of Khepera III robot. Learning and adapting a greyscale color floor system to guide the robot.

## Internship

**Supervisor: E. Zibetti (CHArt-Univ. P8)**

**Paris, France**

*Human Heuristic & Autonomous Robot*

*Sept. 2009–Jan. 2011*

Development of a Java API to control a Khepera III robot using autonomous controller build from Human Heuristics.

**Supervisor: A. Green (Dept. de Physio.-UdeM)**

**Montréal, Canada**

*Controler for physiological experiments*

*May 2009–Aug. 2009*

Graphic interface & communication's tools to control and synchronize experimental setup designed for physiological studies on monkey's nervous system.

**Supervisor: V. Daubin (LBBE-UCBL)**

**Lyon, France**

*Phylogenetic, Bacteriaes & LGT*

*May 2008–Aug. 2008*

C++ implementation of an algorithm used to adjust the species tree with the genetic tree including duplication and Lateral Gene Transfer.

## Organisation and Edition

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### Editorial Activity

**Associate Editor**

**HSSCOMM**

*since June 2022*

Associate editor for Nature Portfolio's open access journal: Humanity and Social Sciences Communication.

**Guest Editor**

**Adaptive Behavior**

*October 2020*

Assistant Editor of the special issue "Evolution of Cultural Complexity", published as the Issue 5 of the volume 28 of journal of Adaptive Behavior.

**Reviewer**

**Various journal**

*Since 2019*

Reviewer for various peer-reviewed journals such as: HSCOMM, JAMT, JAS, PLOS-One, PeerJ Computer Science and others.

### Conference & Seminar Organisation

**Garrod Seminar Series "Cultural Evolution & Archaeology"**

**Cambridge, UK**

*Michaelmas 2023*

Organisation of the principal seminar Series of the Department of Archaeology. Invited Speakers: Alex Mesoudi, Mike O'Brien, Fiona Jordan, Ruth Mace, Felix Riede, Valentine Roux & Stephan Shennan.

**organisation of "Social Modelling & Simulation"**

**Barcelona, Spain**

*December 2023*

Organisation of a 2-days workshop on the use of tools from physical, mathematical, and computational sciences to understand social phenomena.

**Session: "Bayesian Inference in Archaeology" @ CAA**

**Amsterdam, Netherlands**

*August 2023*

Organisation of a session at the 2023 Conference in Computer Applications and Quantitative Methods in Archaeology.

**Seminar: "Computational & Digital Archaeology Laboratory"**

**Cambridge, UK**

*September 2022 to June 2023*

Organisation of 14 lectures on Computational Archaeology at Cambridge University Department of Archaeology.

**Evolution of Cultural Complexity III**

**Thessaloniki, Greece**

*September 2018*

*Website: <https://simoncarrignon.github.io/ccs18/>*

Organisation and chair of the satellite “Evolution of Cultural Complexity” at the 2018 Conference on Complex System.  
Invited speakers: Peter Turchin & Anne Kandler.

**Evolution of Cultural Complexity II** **Cancun, Mexico**  
*September 2017* Website: <https://simoncarrignon.github.io/ccs17/>

Organisation and chair of the satellite “Evolution of Cultural Complexity” at the 2017 Conference on Complex System.  
Invited speakers: Sergi Valverde, Tom Froese & Alex Bentley.

**Darwin as a Conductor** **Lyon, France**  
*Avril 2013* Website: <http://laremi.net>

Organisation and chair of a 3-days conference on the use of Darwinian theories to understand changes in music. Invited speakers: Olivier Morin, Mathieu Charbonneau & Steven Jan.

## Education

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### Academic Curriculum.....

**Universitat Pompeu Fabra** **Barcelona, Spain**  
*PhD Student in Biomedicine* 2015–2019

Co-evolution of trade and culture : theoretical study of the evolution of a decentralized economy driven by cultural dynamics.  
Focus on the Roman Empire case study. Co-direction between Barcelona Supercomputing Center and Univ. Pompeu Fabra  
Complex System Lab.

**Université Denis Diderot Paris 7** **Paris, France**  
*Master Student in Logic, Philosophy, History and Sociology of Science* 2011–2013

Classes in Hist., Philo. & Socio. of Sciences. Topic of interest: Evolutionary Theory and the epistemic link btw. Evolutionary  
Robotics & Evolutionary Biology.

**École Pratique des Hautes Études** **Paris, France**  
*Master Student in Natural & Artificial Cognition* 2009–2011

Classes in Cognitive Sciences with courses of Neurosciences, Cognitive Psychology & Artificial Intelligence.

**Université de Montréal** **Montréal, Canada**  
*Exchange Student* 2008–2009

One year exchange with courses in Neurosciences, Artificial Intelligence & Bioinformatics.

**Université Claude Bernard Lyon 1** **Lyon, France**  
*License Student in Computer Science, sp. MIV* 2007–2009

License with courses in Biology, Computer Science & Bioinformatics.

**Université Joseph Fourier** **Grenoble, France**  
*License Student in Computer Science & Biology.* 2005–2007

Two years to learn the fundamentals in Computer Science & Biology.

### Theses.....

**Supervisor: N. Bredèche** **LRI-INRIA-Paris Sud**  
*Master “Natural & Artificial Cognition”, École Pratiques des Hautes Études (Paris,Fr)* Mars – Aug. 2011

*Title:* Self-organization in swarm of autonomous agents: evolution of specialized behaviors.

*Abstract:* The goal was to investigate the emergence of speciation during environment-driven evolutionary adaptation in a population of autonomous robotic units. We address the case of sympatric speciation (occurrence of speciation without geographical isolation). We show that such speciation is possible in a robotic setup under very specific constraints with respect to mating opportunities and resources distribution.

**Supervisor: F. Bouchard** **CIRST-UdeM (Canada)**  
*Master “Logic Philosophy History & Sociology of Sciences”, Univ. Paris 7 (Fr)* Apr. – Sept. 2013

*Title:* Evolutionary Robotics as a model to study Evolutionary Biology.

*Abstract:* To justify the use of Evolutionary Robotics as a model to study evolution, we first explain the general principles and history of darwinian evolution and present current approaches. After, we underline the pertinance of the application of models (as in the semantic view), and simulations of those models, to study life. To finally introduce ER and to show that, as an embodied artificial life experiment, it combines numerous advantages that make it an ideal model to study evolution.

**Supervisors: S. Valverde & X. Rubio-Campillo** **BCS-Complex Systems Lab-UPF**  
*PhD School of Biomedicine, Universitat Pompeu Fabra (Barcelona,Spain)* Sept. 2015 – Sept. 2019

*Title:* Content-dependent biases in social learning strategies: a multiscale approach.

*Abstract:* The content of what we learn shapes the evolution of human culture and society. In this thesis, we have quantified the influence of content-dependent biases in social learning strategies. Our theoretical framework combines agent-based models and Bayesian inference to measure content-dependent biases in large-scale social learning strategies. Our first empirical study measures the impact of social transmission biases in Twitter. The novelty of the second study is two-fold: ours is one of the rare uses of computational modelling in historical Roman Studies and one of the first tests of the impact of success bias across large spatial and temporal scales.

## Summer School & Workshop.....

<b>2018 DySoC Critical Workshop</b>	<b>Knoxville, USA</b>
<i>Modeling Complex Systems in Archaeology</i>	<i>June 2018</i>
Workshop to discuss, evaluate and increase awareness about Complex System techniques in Archaeology	
<b>2018 NECSI Winter School</b>	<b>Cambridge, USA</b>
<i>New England Complex System Institute Winter School</i>	<i>January 2018</i>
Intensive week-long courses on complexity science: modeling, networks, and data analytics.	
<b>2017 UrbNet</b>	<b>Aarhus, Denmark</b>
<i>UrbNet, Aarhus University</i>	<i>October 2017</i>
Specialist workshop for the Danish-German Jerash Northwest Quarter Project.	
<b>2016 SFI CSSS</b>	<b>Santa Fe, USA</b>
<i>Santa Fe Institute Complex System Summer School</i>	<i>June 2016</i>
4 weeks series of lectures, labs, and discussion on foundational concepts, tools, and current topics in Complexity Science.	
<b>1st DACAS International Workshop</b>	<b>Manchester, England</b>
<i>Data And Cities As Complex Adaptive Systems</i>	<i>Feb 2016</i>
Development of an innovative and cross-disciplinary set of tools to study cities as Complex Adaptive Systems.	
<b>Scientific World Conception Summer School</b>	<b>Vienna, Austria</b>
<i>The Computational turn: Simulation in Science.</i>	<i>July 2015</i>
Discussions & lectures on the epistemological consequences of the use of computational methods and simulation in science.	
<b>Summer Institute in Cognitive Sciences</b>	<b>Montreal, Canada</b>
<i>The Evolution and Function of Consciousness.</i>	<i>September 2012</i>
Week of lectures on the Evolution and Function of consciousness.	

## Grant & Fundings

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<b>UK-Italy Trustworthy AI Visiting Researcher (2024):</b> Exploring the impact of LLM on cultural evolution	£3 540
<b>Garrod Seminar (2023):</b> Fund from University of Cambridge to organise Michaelmas Garrod Seminar Series	£2 000
<b>C2D3 ECR Seed Fund (2023):</b> Exploring socio-economic processes behind sustainable food system adoption	£3 425
<b>BA/Leverhulme Small Grant (2023):</b> A collaborative game to improve archaeological inference	£9 644
<b>Severo Ochoa Mobility Grant (2018):</b> Accommodation & travel for 1-month visiting research	2 000€
<b>NECSI Winter School Scholarship (2018):</b> Inscription fees for NECSI winter school	\$1 300
<b>DACAS Early Career Bursary (2016):</b> Accommodation & travel for DACAS Workshop	£350
<b>ENS Lyon - Junior Lab (2011-2013):</b> Funding for meetings, experiments and conferences	3 000€

## Languages

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**French:** Mother Tongue

**English:** Good

*Written & spoken academic English*

**Spanish:** Good

*Fluent daily use*

## Technical skills

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**OS:** Linux (Ubuntu/Debian/rasbian end & admin user), FreeBSD, Windows XP, Seven, Vista. Grid/Supercomputer

usage.

**Publishing:** L<sup>A</sup>T<sub>E</sub>X/ LuaT<sub>E</sub>X, Open Office & Microsoft Office Writers.

**Programming:** C/C++, R, Bash, Python, (Java, Php).

**Parallel Computing:** MPI (R/C/C++/Python), SLURM, LSF.

**Statistical analysis/Visualisation:** R.

**Git:** Personal repositories [@github.com](https://github.com) & [@framagit \(gitlab\)](https://framagit.org)

## Interests

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Among other things, I used to have a lot of associative activities mostly revolving around music and sciences communication & popularization. I like reading, walking in the hills of my childhood and dive into the Linux CLI.

## Publications & Conference

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### Peer reviewed paper in journal or proceedings.....

A. Bentley, S. Carrignon, and D. Ruck. Modelling drift and selection in cultural evolution. In J. J. Tehrani, J. Kendal, and R. Kendal, editors, *The Oxford Handbook of Cultural Evolution*. Oxford University Press, in press.

R. A. Bentley, J. Borycz, S. Carrignon, D. J. Ruck, and M. J. O'Brien. Machine learning for rediscovering revolutionary ideas of the past. *Adaptive Behavior*, page 1059712320983045, 2021.

R. A. Bentley, S. Carrignon, and D. Ruck. Modelling Drift and Selection in Cultural Evolution. In *The Oxford Handbook of Cultural Evolution*. Oxford University Press.

R. A. Bentley, S. Carrignon, D. J. Ruck, S. Valverde, and M. J. O'Brien. Neutral models are a tool, not a syndrome. *Nature Human Behaviour*, 5(7):807–808, 2021.

R. A. Bentley, B. Horne, J. Borycz, S. Carrignon, G. Shteynberg, B. Vidiella, S. Valverde, and M. J. O'Brien. Cultural evolution, disinformation, and social division. *Adaptive Behavior*, 0(0):10597123231186432, 2023.

N. Bredeche, J.-M. Montanier, and S. Carrignon. Evolutionary adaptation of a population of robots: benefits and issues of the evo-devo approach. An answer to Y. Jin and Y. Meng: *Evolutionary Developmental Robotics – The Next Step to Go. Newsletter of the Autonomous Mental Development Technical Committee*, 8(2):8–9, 2011.

N. Bredeche, J.-M. Montanier, and S. Carrignon. Benefits of Proportionate Selection in Embodied Evolution: A Case Study with Behavioural Specialization. In *Proceedings of the Genetic and Evolutionary Computation Conference Companion*, GECCO '17, pages 1683–1684, New York, NY, USA, 2017. ACM.

T. Brughmans, S. Carrignon, and I. Romanowska. Artificial economies: Computational simulation of product preference theories for explaining jerash ceramic assemblages. In *Ceramics in Context Status Report 2015-2018*, pages 56–57. 2018.

T. Brughmans, J. W. Hanson, M. J. Mandich, I. Romanowska, X. Rubio-Campillo, S. Carrignon, S. Collins-Elliott, K. Crawford, D. Daems, F. Fulminante, et al. Formal Modelling Approaches to Complexity Science in Roman Studies: A Manifesto. *Theoretical Roman Archaeology Journal*, 2(1):19, 2019.

S. Carrignon, R. A. Bentley, and D. Ruck. Modelling rapid online cultural transmission: Evaluating neutral models on Twitter data with Approximate Bayesian Computation. *Palgrave Communication*, 2019.

S. Carrignon, R. A. Bentley, M. Silk, and N. H. Fefferman. How social learning shapes the efficacy of preventative health behaviors in an outbreak. *PLOS ONE*, 17(1):1–17, 01 2022.

S. Carrignon, T. Brughmans, and I. Romanowska. Tableware trade in the roman east: Exploring cultural and economic transmission with agent-based modelling and approximate bayesian computation. *PLOS ONE*, 15(11):1–23, 11 2020.

S. Carrignon, T. Brughmans, and I. Romanowska. Copying of economic strategies in eastern mediterranean inter-regional tableware trade. In T. Brughmans and A. Wilson, editors, *Simulating Roman Economies: Theories, Methods, and Computational Models*, page 144. Oxford University Press, 2022.

S. Carrignon, M. Coto-Sarmiento, R. A. Bentley, and M. J. O’Brien. An introduction to papers from workshops on the evolution of cultural complexity. *Adaptive Behavior*, 28(5):317–322, 2020.

S. Carrignon, J.-M. Montanier, and X. Rubio-Campillo. Modeling the Co-evolution of Trade and Culture in Past Societies. In L. Yilmaz, M. Chan, I. Moon, T. M. K. Roeder, C. Macal, and M. Rossetti, editors, *2015 Winter Simulation Conference*, pages 3949–3960, Huntington Beach, United States, Dec. 2015.

I. Gaudiello, E. Zibetti, and S. Carrignon. Representations to go: learning robotics, learning by robotics. In *Workshop Proceedings of Intl. Conf. on Simulation, Modeling and Programming for Autonomous Robots (SIMPAN 2010)*, pages 484–493, 2010.

D. Medernach, S. Carrignon, R. Doursat, T. Kowaliw, J. Fitzgerald, and C. Ryan. Evolution of heterogeneous cellular automata in fluctuating environments. In *Proceedings of the Artificial Life Conference 2016*, pages 216–223. MIT Press, 2016.

D. Medernach, J. Fitzgerald, S. Carrignon, and C. Ryan. Evolutionary Progress in Heterogenous Cellular Automata (HetCA). In *Proceedings of the European Conference on Artificial Life 2015*, pages 512–519. MIT Press, 2015.

J.-M. Montanier, S. Carrignon, and N. Bredeche. Behavioral Specialization in Embodied Evolutionary Robotics: Why So Difficult? *Frontiers in Robotics and AI*, 3:38, 2016.

A. J. Pritchard, M. J. Silk, S. Carrignon, R. A. Bentley, and N. H. Fefferman. Balancing timeliness of reporting with increasing testing probability for epidemic data. *Infectious Disease Modelling*, 7(2):106–116, 2022.

T. Pryce, S. Carrignon, M. Cadet, K. T. Oo, S. N. Oo, T. T. Win, A. Aye, B. Pradier, B. Bellina, C. L. Meur, and et al. A partial prehistory of the southwest silk road: Archaeometallurgical networks along the sub-himalayan corridor. *Cambridge Archaeological Journal*, page 1–40, 2023.

I. Romanowska, T. Brughmans, P. Bes, S. Carrignon, L. Egelund, A. Lichtenberger, and R. Raja. A study of the centuries-long reliance on local ceramics in jerash through full quantification and simulation. *Journal of Archaeological Method and Theory*, 29(1):31–49, 2022.

M. J. Silk, S. Carrignon, R. A. Bentley, and N. H. Fefferman. Improving pandemic mitigation policies across communities through coupled dynamics of risk perception and infection. *Proceedings of the Royal Society B*, 288(1955):20210834, 2021.

M. J. Silk, S. Carrignon, R. A. Bentley, and N. H. Fefferman. Observations and conversations: how communities learn about infection risk can impact the success of non-pharmaceutical interventions against epidemics. *BMC public health*, 22(1):1–12, 2022.

## **Posters in conferences** .....

S. Carrignon. Why apply evolutionary theory to melodies. In *poster at: 3-Day International Conference on Evolutionary Patterns, Calouste Gulbenkian Foundation, Lisbon, Portugal*, 2013.

S. Carrignon and M. Coto-Sarmiento. Exploring the dynamic of changes: An Agent Based Model to understand the amphorae production patterns in the Roman Empire. In *Culture Conference*, June 2016.

S. Carrignon and L. Mesalles. Drivers of cultural diversification in precipitous terrains: can morphological characteristics explain language diversity in the Taiwan mountain belt? In *AGU Fall Meeting 2019*. AGU, 2019.

S. Carrignon and X. Rubio-Campillo. Impact of different social learning mechanisms on the emergence of a Walrasian Equilibrium. In *European Human Behavior Evolution Association conference (EHBEA)* , Avril 2017.

S. Carrignon and X. Rubio-Campillo. Innovation Process and Economic Equilibrium . In *Early-career Social Learning Researchers Winter Worskshop*, Janvier 2017.

I. Morer, S. Carrignon, and X. Rubio-Campillo. Influence of the topology of cultural networks on the equilibrium of an exchange-based economy. In *7th Workshop on Complex Networks (CompleNet 2016)* , Avril 2016.

### **Talks in conferences**.....

J. Adams, S. Carrignon, A. Olle, and S. Duran. Modeling the co-evolutionary dynamics of the Lobaria pulmonaria lichen symbiosis . In *Conference on Complex System*, September 2016.

S. Carrignon. Agent Based Modeling and Bayes Inference to learn about the past: the need for High Performance Computing. In *Conference on Complex System* , September 2018.

S. Carrignon, A. Bentley, D. Ruck, and M. Gilchrist. How the intrinsic value of information can change the spread of news in social media . In *2nd Conference of the Cultural Evolution Society*. Arizona State University, Oct. 2018.

S. Carrignon and M. Coto-Sarmiento. All roads lead to Rome: Using least cost path to explore cultural transmission during Roman Empire. In *49 Computer Applications and Quantitative Methods in Archaeology Conference (CAA 2022)* , Avril 2022.

S. Carrignon and L. Mesalles. Exploring Taiwan’s first settlement using models of cultural transmission. In *27th Annual Meeting of the European Association of Archaeologist*. European Association of Archaeologist, 2021.

S. Carrignon, J.-M. Montanier, J. Michaud, and X. Rubio-Campillo. Co-evolution of culture and trade : impact of cultural network topology on economic dynamics. In *44th Computer Applications and Quantitative Methods in Archaeology Conference (CAA 2016)* , Avril 2016.

S. Carrignon, A. Mosca, B. Rondelli, and J. Remesal. Computer modelling and simulation as heuristic tool to understand the past: the case of the EPNEt project. In *Model and Simulation 7*, May 2016.

S. Carrignon, I. Romanowska, and T. Brughmans. An Agent-Based Model of Trade in the Roman East (25 BC – AD 150). In *28th Theoretical Roman Archaeology Conference (TRAC)*, April 2018.

S. Carrignon, S. Shoda, L. Brainerd, C. Stevens, and E. Crema. Detecting cultural boundaries during the Jomon/Yayoi transition. In *9th worldwide conference of the Society for East Asian Archaeology* , July 2022.

M. Coto-Sarmiento and S. Carrignon. Agent Based Model to detect variations in the transmission of potters from Baetica province. In H. Propylaeum, editor, *19th International Congress of Classical Archaeology*, pages 73–76, May 2023.

G. Dato, S. Carrignon, B. Zhu, A. Tarun, E. Strombom, R. Minxha, B. Ferguson, T. Eli, and P. Pika. Patterns In Globalization - Viewed through the lens of Trieste . In *Conference on Complex System*, September 2016.

### **Pre-prints/Non-peer reviewed papers**.....

S. Carrignon, R. A. Bentley, and M. J. O’Brien. Estimating two key dimensions of cultural transmission from archaeological data. *Available at SSRN 4359462*, 2023.

S. Carrignon, A. Ollé-Vila, S. Duran-Nebreda, and J. N. Adams. Modeling the coevolutionary dynamics in the lobaria pulmonaria lichen symbiosis. *Santa Fe CSSS Proceedings*, 2016.