



Ramon Ferrer-i-Cancho

Associate professor (tenured)

Department of Computer Science

Universitat Politècnica de Catalunya (UPC)

Campus Nord, Edifici Omega, Despatx S124

08034 Barcelona, Catalonia, Spain.

rferrericancho@cs.upc.edu

+34 934134028

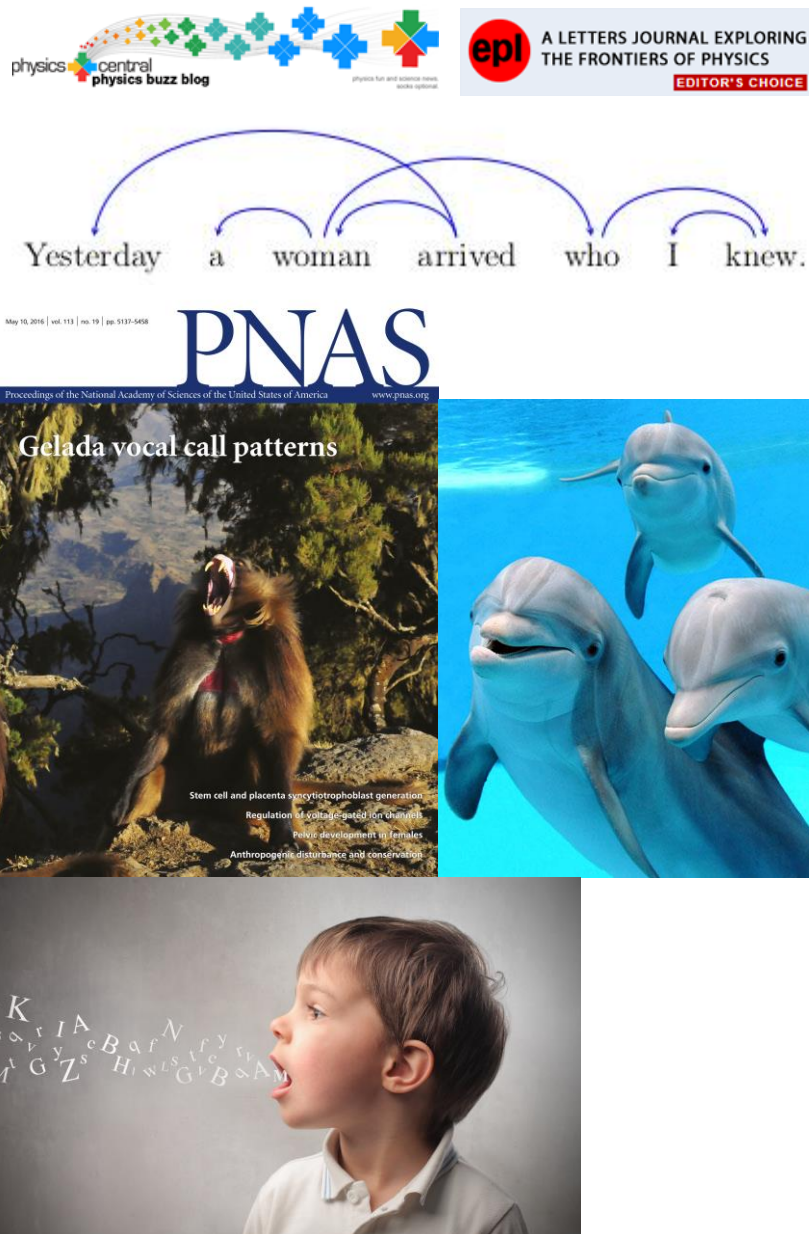
<https://cqlab.upc.edu/people/rferrericancho/>

[Open Researcher and Contributor ID \(ORCID\):](#)

[0000-0002-7820-923X](#)

[ResearchID: A-5424-2011](#)

Coordinator of the new [Quantitative, Mathematical and Computational Linguistics Research Group](#) (UPC - Catalan level) and head of the [Complexity and Quantitative Linguistics \(CQL\) Lab](#). Department of Computer Science, Universitat Politècnica de Catalunya, Barcelona, Catalonia (Spain).



Who am I?

I am essentially a language researcher, but in a uniquely broad sense. I could be described as an information scientist or a quantitative linguist but my work spans and integrates a range of other disciplines. Modern quantitative linguistics was founded by G. K Zipf in the 1940s and is mainly concerned with the actual statistical properties of languages, e.g., statistical laws of language, and their origin. Within human language, my research covers a wide range of topics: formal constraints on syntactic dependency structures (e.g., Gómez-Rodríguez et al 2019), language universals (e.g., Bentz & Ferrer-i-Cancho 2015, Ferrer-i-Cancho 2008 in ACS), language variation (e.g., Ferrer-i-Cancho 2016 in EVOLANG11, Ferrer-i-Cancho 2005 in EPJ B), language learning (e.g., Ferrer-i-Cancho 2016 in Glottometrics, Casas et al 2019) and language evolution (e.g., Ferrer-i-Cancho et al 2005 in PRSL B, Ferrer-i-Cancho 2015 in LDC). Moreover, I have been opening quantitative linguistics (and consequently linguists in general) to other areas such as biology (Ferrer-i-Cancho et al 2014 in SAGMB) and physics (Ferrer-i-Cancho 2005 in EPJ B, Ferrer-i-Cancho 2004 in PRE). My research covers different levels of the organization of life: from human language to animal behavior (Ferrer-i-Cancho & Lusseau 2009, Ferrer-i-Cancho & McCowan 2012) and down farther to the molecular level (Ferrer-i-Cancho 2011 in Complexity). Central to such a multidisciplinary research program is the exploration of statistical similarities between human language and the behavior of other species (dolphins, macaques, geladas) and genomes. That exploration is motivated by the quest for fundamental principles of organization of behavior and life in general (Ferrer-i-Cancho et al 2013 in CS, Gustison et al 2016 in PNAS).

In parallel, I have been challenging multiple long-standing dogmas. Some examples are:

- The belief that statistical laws are not an important area for academic study because they allow for a simple explanation (Ferrer-i-Cancho & Elvevåg 2010, Ferrer-i-Cancho et al 2014 in SAGMB).
- The belief in constraints on word order (“grammar”) that are detached from performance considerations (Ferrer-i-Cancho & Gómez-Rodríguez 2016 in Glottometrics).
- The standard model of typology for the ordering of subject, verb and object (Ferrer-i-Cancho 2015 in EVOLANG11).
- The uniform information density hypothesis and related hypotheses (Ferrer-i-Cancho & Moscoso del Prado Martín 2011 in JSTAT; Ferrer-i-Cancho et al 2013 in JSTAT).

As an alternative, I have put forward:

- A unified theory of linguistic laws (Zipf’s law for word frequencies, Zipf’s law of abbreviation, Menzerath’s law) based on the general principle of compression (Ferrer-i-Cancho 2016 in Complexity, Gustison et al in PNAS).
- A unified theory of word order variation and word order change (Ferrer-i-Cancho 2015 in EVOLANG11). A major component of this theory is a cost-cutting hypothesis relating to the scarcity of dependency crossings and formal constraints on crossing dependencies (Gómez-Rodríguez & Ferrer-i-Cancho 2016, Gómez-Rodríguez et al 2019).

Given my challenging of established dogmas, and the fact that my work does not sit easily within one disciplinary area, it is not surprising that my research has generated significant scholarly discussion (e.g., Cysouw 2008, Solé 2010, Alday 2015). I accept that it is perhaps possible to find better explanations than my models for *specific* problems or subproblems but these are likely to not be able to generalize or to lead to a fat theory of language when stacked in a broader theory. The construction of such a compact general theory is (or should be) the ultimate goal of research; achieving this is my main concern.

I hope that I will be judged by

- The ambition of my research goals and their proofs-of-concept in my publication record,
- The multidisciplinary and the originality of my contributions,
- The predictive power and the parsimony of my arguments,
- The impact of my publications

rather than by standards from a given discipline.

BIO

Born in Lleida (Catalonia) in 1973.

EDUCATION

- 2007 Master degree in applied physics (Universitat Politècnica de Catalunya, UPC)
- 2003 PhD in computer science (UPC). Thesis title: [Language: universals, principles and origins](#). Supervisor: Ricard V. Solé
- 1997 Degree in computer science (UPC)

LANGUAGES SPOKEN

- Catalan, Spanish, English, French and Italian.

EMPLOYMENT

- July 2011 – present. Associate professor (tenured). Department of Computer Science. Universitat Politècnica de Catalunya (Barcelona).
- August 2007 – July 2011. Lecturer. Same department.
- January 2006 – August 2007 “Juan de la Cierva” postdoctoral fellow at the PhysComp² (Physics and Computation of Complex Systems). Department of Fundamental Physics, Universitat de Barcelona. Research leader: Albert Diaz-Guilera.
- 2005 Postdoctoral researcher in the ECAgents European Project. Gruppo PIL. Department of Physics. Università “La Sapienza”, Rome (Italy). Research leader: Vittorio Loreto.
- 2004 Postdoctoral researcher. Gruppo PIL. Department of Physics. Università “La Sapienza”, Rome (Italy). Research leader: Guido Caldarelli.
- 2000-2003 Predoctoral Researcher. Complex Systems Lab. Initially at Universitat Politècnica de Catalunya (Department of Applied Physics) and finally at Universitat Pompeu Fabra (Department of Experimental and Health Sciences / IMIM). Barcelona. Research leader: Ricard V. Solé.
- 1998-April 2000. Research collaborator (work for free) at the Complex Systems Lab at Universitat Politècnica de Catalunya (Department of Applied Physics). Research leader: Ricard V. Solé.
- October-December 1997. Predoctoral Researcher. Department of Basic Psychology. Universitat de Barcelona. Research leader: Josep Maria Sopena Sisquella.

OTHER POSITIONS

- 2022-present. Academic Secretary of the Department of Computer Science at UPC.
- 2021-present. Faculty member of IMTech (Institute of Mathematics of UPC-BarcelonaTech).
- 2020-present. External member of the scientific committee of the *Linguistics and Digital Humanities* doctoral program (Department of Linguistics, Palacky University, Olomouc, Czech Republic).
- 2019-present. Member of the Catalan Association of Language and Literature.
- 2017-2022. Treasurer of the Catalan Association for the Study of Complex Systems (complexitat.cat). Plain member before.
- 2023-, 2014-2021. Council member at large of the International Quantitative Linguistics Association (IQLA).
- 2012-present. Member of the Academic Committee of the Master in Informatics Engineering, School of Informatics Engineering (*Comissió Acadèmica del Màster en Enginyeria Informàtica, Facultat d'Informàtica de Barcelona*), Universitat Politècnica de Catalunya.
- 2008-2016 Member of the permanent committee of the Evolution of Language Conference (EVOLANG).

AWARDS

- Sabbatical leave (1 September 2018 – 31 August 2019) granted by Universitat Politècnica de Catalunya.
- Barcelona City Research Prize 2003 for the article "Least effort and the origins of scaling in human language" (PNAS 100, 788-791). Award to the best scientific article published in 2003 by Catalan researchers.

- Joan Lluís Vives Prize 2003 (mathematical, physical and life sciences, and engineering) for the article "On the uniqueness of human language" ("*Sobre la singularitat del llenguatge humà*"). The winning article was published in the journal "El Temps" (number 1041, May 2004).
- PhD price from Universitat Politècnica de Catalunya (*Premi extraordinari de doctorat, curs 2003-2004*) for the PhD thesis: "Language: universals, principles and origins".

DISTINCTIONS

- The article "A stronger null hypothesis for crossing dependencies" was selected by the editors of Europhysics Letters for inclusion in the exclusive 'Highlights of 2014' collection. Also known as EPL Editor's choice articles.
- Accreditation of Advanced Research issued by AQU Catalunya in 2015 (needed for a full professorship in the Catalan system).

ADVISOR

PhD theses:

- 2014 "Theory, Algorithms and Applications of Linear Arrangements of Trees: Generation, Expectation and Optimization" by L. Alemany-Puig.
- 2014 "The laws of linguistics in communication systems" ("*Las leyes de la lingüística en los sistemas de comunicación*") by A. Hernández-Fernández (advised jointly with F. Diéguez-Vide).

Master theses:

- 2024 "Unsupervised categorization of killer whale pulsed calls", M. Paraskeva (advised jointly with M. Arias), MDS, UPC.
- 2022 "The distribution of dependency distances", S. Petrini, Master in Data Science and Economics, Università Degli Studi di Milano (advised jointly with N. Cesa-Bianchi).
- 2021 "Generalized optimization models of linguistic laws", D. Carrera-Casado, MIRI, UPC.
- 2021 "The optimality of word lengths", J. Moreno-Fernández (advised jointly with C. Bentz), MIRI.
- 2020 "Dolphin communication. A quantitative linguistics approach", A. Vradi, MIRI.
- 2020 "Human language through the lens of large word co-occurrence networks", S. Mosquera Dopico, MIRI.
- 2019 "Edge crossings in linear arrangements: from theory to algorithms and applications", L. Alemany-Puig, MIRI, UPC.
- 2015 "Categorization of dolphin whistles", C. Pimentel Seguin (advised jointly with M. Arias). Master in Data Mining and Knowledge Management.

ORGANIZER OF SCIENTIFIC EVENTS

- Quantitative Dependency Syntax (one of the events of the SyntaxFest). Paris, August 26, 2019. Organized jointly with X. Chen.
- The origins and evolution of word order. A multidisciplinary workshop. A satellite workshop of Evolang XII. Torun, Poland, 16 April 2018. Organized jointly with M. Fedzechkina.
- Statistics of languages: theories and experiments. An interdisciplinary workshop. Warsaw, Poland, 19-22 July 2017. Organized jointly with L. Debowski and K. Tanaka-Ishii.
- Round Table: The future of research on language (*Taula rodona: El futur de la recerca en llenguatge*), Universitat Pompeu Fabra, 16 September 2015. Organized jointly with A. Badia
- 3th meeting of the Catalan Association for the Study of Complex Systems (*III Jornada complexitat.cat*). Universitat Politècnica de Catalunya, 19 June 2014. Organized jointly with A. Hernández-Fernández.
- (as local coordinator) 7th International Evolution of Language Conference (Evolang 2008), Barcelona (March 11-15, 2008).
- Meeting on Brain and Language (*Jornada de Cervell i Llenguatge*). Universitat de Barcelona, 2 July 2007.
- Meeting on Animal Cognition and Communication (*Jornada de Comunicació i Cognició Animal*), Universitat de Barcelona, 3 July 2006.

TEACHING

EXPERIENCE

- 2022 – present **Introduction to Quantitative Linguistics**. Master in Innovation and Research in Informatics (MIRI) and Master in Data Science (MDS), Universitat Politècnica de Catalunya (UPC).
- 2020-2022 Algorithms and Data Structures. Bioinformatics degree. Universitat Pompeu Fabra (UPF).
- Fall 2019-present Computing and Intelligent Systems. Master in Informatics Engineering, UPC.
- 2016-present (as professor and **coordinator**) Information Retrieval & Recommender Systems. MDS, UPC.
- 2016-present (as professor and **coordinator**) Search and Analysis of Massive Information (*Cerca i anàlisi d'informació massiva*). Computer Science Degree, UPC.
- 2013-present (as professor and **coordinator**) Complex and Social Networks. MIRI, UPC.
- 2010-2017 Introduction to Programming 2 (*Programació 2*). Computer Science Degree, UPC. **Co-coordinator between 2013 and 2016 (the course had about 300 students and a team of about 13 professors).**
- 2009-2010 Compilers (*Compiladors*). Computer Science Degree, UPC
- 2007-2008 Introduction to Programming 1 (*Programació 1*). Computer Science Degree, UPC.
- 2007-2007 Mechanics Laboratory. Physics Degree, Universitat de Barcelona.

SELECTED PUBLICATIONS ON TEACHING RESEARCH

1. Sanou Gozalo, E., Hernández-Fernández, A., Arias, M. & Ferrer-i-Cancho, R. (2017). Does like seek like? The formation of working groups in a programming project. *Journal of Technology and Science Education* 7 (2), 231-240.
2. Arias Vicente, M. and Ferrer Cancho, R. (2010). Strategies to improve the performance in a hard theoretical course from the selective phase (*Estrategias de mejora del rendimiento en una asignatura teórica difícil de la fase selectiva*). *Actas de las VII Jornadas Internacionales de Innovación Universitaria*, 6-7 septiembre del 2010, Villaviciosa de Odón (Madrid).
3. Ferrer Cancho, R. and Arias Vicente, M. (2010). The low theoretical performance of students in theoretical and practical courses. Possible solutions (*El bajo rendimiento teórico de los alumnos en asignaturas teórico-prácticas. Posibles soluciones*). *Actas de las VII Jornadas Internacionales de Innovación Universitaria*, 6-7 septiembre del 2010, Villaviciosa de Odón (Madrid).

COMMUNICATION AND IMPACT

INVITED TALKS

1. 2023 “How cost minimization shapes languages and other animal communication systems”. Language: from tabula rasa to biological determinism. *Frontiers Dialogues*. Academia Europaea – Barcelona Knowledge Hub (Barcelona, 22 November 2023).
2. 2022 “The optimality of languages”. Complexity in language variation of change. Satellite session for the Conference on Complex Systems (Palma de Mallorca, Spain, 20 October 2022).
3. 2022 (**inaugural lecture**) “How cost minimization and trade-offs shape language”. Cognitive Science and Language postgraduate program (master and PhD) co-organized by five Catalan universities (Barcelona, 29 September 2022).
4. 2022 (**inaugural lecture**; online) “Human language and animal communication. An insight from quantitative linguistics and comparative psychology”. Postgraduate Program in Animal Biology. Universidade Federal do Rio Grande do Sul (Porto Alegre, Brazil, 2 September 2022).
5. 2022 “Caminando sobre la pirámide de construcción de teoría (lingüística)”. Grupo de Estadística para el Estudio del Lenguaje, GESEL (Buenos Aires, Argentina, 23 July 2022; online).
6. 2022 “Human language and animal communication. An insight from quantitative linguistics and comparative psychology”. PhD Program in Linguistics, Literature and Translation. School of Philosophy and Literature (Málaga, Spain, 12 May 2022).
7. 2021 (**keynote speaker**) “Trekking on the pyramid of (linguistic) theory construction”. Xth Peripatetic Conference on Cognitive Systems Modeling (Zakopane, Poland, 21-23 October).
8. 2019 (**keynote/plenary speaker**) “Dependency distance minimization: facts, theory and predictions.” Syntax Fest 2019 (Paris, France). August 25-30.
9. 2018 “Statistical laws of language in humans, other species and genomes: amusement or real science?”. Conference on Quantitative Approaches to Language Studies (Warwick, UK). 25-26 September. Bridges Programme.
10. 2017 “A breakpoint in the decay of the distribution of syntactic dependency lengths”. Cognitive Network Science. A satellite of NetSci 2017 (Indianapolis, USA). Organized by N. M. Beckage, Y. N. Kenett, M. Stella & M. S. Vitevitch.
11. 2016 “Word order in light of network theory”. Winer Conference on Network Science in Cognitive Structures. 8-9 October. University of Purdue (USA). Organized by M. Vitevitch & R. Sweickert.

12. 2015 "Parallels of human language in the behavior of dolphins", International Meeting Consciousness & Communication in Dolphins", Genoa (Italy). 7 May. Organized by Università degli Studi di Genova (Roberta Mandich).
13. 2013 "Linguistic theory from information theory". Workshop Language and Information. University of Utrecht. 12 September. Organized by Sergey Avrutin & M. van Egmond.
14. 2013 "Information theoretic principles of human language and animal behavior", Analyzing Animal Vocal Sequences. NIMBioS Investigative Workshop. 21-23 October. Organized by D. Blumstein, M. A. Roch, and A. Kershenbaum.
15. 2013 "Scaling laws of human language: divertimento or real science?" Journée IXXI sur les lois de puissance", Lyon (France). 7 March. Organized by IXXI (<http://www.ixxi.fr/?p=1943>).
16. 2011 "The world war of word orders. Insights from complex systems science". ANNUAL Workshop Cognitive Science and Language master. Barcelona.
17. 2011 "Statistical patterns of language outside human language: facts and open issues". 1st International work-conference on linguistics, biology and computer science (LBCSI 2011). 14-18 March. Facultat de Lletres, Universitat Rovira i Virgili. Tarragona, Catalonia (Spain). Organized by G. Bel-Enguix, V. Dahl and M. D. Jiménez-López,
18. 2011 "Word order as a constraint satisfaction problem: A mathematical approach." Complexity in Language: Developmental and Evolutionary Perspectives, Collegium de Lyon, May 23 - 24, 2011.
19. 2010 (**keynote speaker**) "Linguistic Networks and Quantitative Linguistics" at Leipzig Linguistic Network Meeting (LLNM 2010), Leipzig (Germany). Organized jointly by Leipzig University and Bielefeld University. 26 January (<http://llnm.informatik.uni-leipzig.de/>).
20. 2010. "Statistical linguistics: divertimento or real science?" VII Jornada IULA: Lingüística i estadística. Barcelona, Catalonia (Spain). Organized by IULA - Universitat Pompeu Fabra.
21. 2009. Myths about Zipf's law for word frequencies. Symposium - Scaling laws in cognitive science (Cogsci 2009). Organized by Chris Kello, Cognitive Science Society. Amsterdam (The Netherlands).
22. 2008 "Language for free". NET-ACE conference. 17-19 September. Brunel University.
23. 2008 "Estalvi energètic a les llengües". Encontre Internacional Noves Fronteres de la Ciència, l'art i el pensament. En Ressonància. Barcelona, Catalonia.
24. 2007 (**keynote speaker**) "The architecture of language", I Seminário de Pesquisa CONES ("1st CONES Research Seminar"). 3-4 December. Salvador de Bahia, Brasil. The other invited speakers were Miguel Nicolelis (US) and Sidarta Ribeiro (Brazil).
25. 2005 "A theory of Zipf's law in natural communication systems", Animal behavior, cognition and communication: the role of networks and information (Workshop). Santa Fe Institute. Santa Fe (New Mexico, USA)

MEETINGS

Quantitative linguistics

- Quantitative Linguistics Conference (Qualico; the official meeting of the IQLA): 2023 (Lausanne, Switzerland), 2018 (Wrocław, Poland), 2016 (Trier, Germany), 2014 (Olomouc, Czech Republic), 2012 (Belgrade, Serbia), 2009 (Graz, Austria).
- 5th Trier Symposium on Quantitative Linguistics (2007), Trier, Germany.
- Modern methods in Linguistics (2006), Budmerice, Slovakia.
- 4th Trier Symposium on Quantitative Linguistics (2003), Trier, Germany.

Evolution of Language International Conference (Evolang):

- 2018 (Torun, Poland), 2016 (New Orleans, USA), 2014 (Vienna), 2012 (Kyoto), 2010 (Utrecht), 2008 (Barcelona), 2006 (Rome), 2004 (Leipzig).

International School and Conference on Network Science (NetSci):

- 2018 (Paris, France), 2017 (Indianapolis, USA), 2015 (Zaragoza, Spain; Language & Networks satellite).

Complex systems and network science:

- (European) Conference on Complex Systems (ECCS): 2013 (Barcelona), 2005 (Paris, France).
- Annual meetings of Complexitat,cat
- Modeling Linguistic Networks: from Language Structures to Communication Processes. 2012 (Frankfurt, Germany).
- Statistical Mechanics of Complex Networks. XVIII Sitges Conference. 2002 (Sitges, Catalonia).

Cognitive science:

- Annual Meeting of the Cognitive Science Society (Cogsci): 2009 (Amsterdam, The Netherlands), 2013 (Berlin, Germany).
- Reappraising the role of linear structure in language. Lorentz Center, 2015 (Leiden, The Netherlands).

Other conferences:

- 2018 Societas Linguistica Europaea (SLE) 2018 (Tallinn, Estonia).
- 2016 Graph-TA 4 (Barcelona, Catalonia).

- 2015 Causality in the language sciences. Max Planck Institute for Mathematics in the Sciences. (Leipzig, Germany).
- 2013 NIMBioS Investigative Workshop Analyzing Animal Vocal Sequences (Knoxville, USA).
- 2011 Complexity in language: developmental and evolutionary perspectives (Lyon, France).
- 2009 ATACD conference. Changing Cultures: Cultures of Change (Barcelona, Catalonia).
- 2005 International School on Semiotic Dynamics, Language and Complexity (Erice, Italy).
- 2005 Approaches to Complexity in Language (Helsinki, Finland).
- 2004 Origins of Language & Psychosis. SANE POWIC and Language Origins Society (LOS) (Oxford, UK).

Some talks at research institutions:

- 2017,2019 Xi'an Jiaotong University, School of Foreign Studies (Xi'an, China).
- 2019 University of Tübingen, Department of Linguistics (Tübingen, Germany); Universidad Autónoma de México.
- 2016 University of Zürich (Switzerland), Centre de Recerca Matemàtica (Barcelona, Catalonia).
- 2013 University of California at Davis (Davis, USA).
- 2012 Centre d'Estudis Avançats de Blanes (Blanes, Catalonia).
- 2007 Institute for Cross-Disciplinary Physics and Complex Systems, IFISC (Palma de Mallorca, Spain).
- 2006 Universitat de Barcelona (Barcelona, Catalonia).
- 2004 Universitat Pompeu Fabra (Barcelona, Catalonia).
- 2003 University of Edinburgh (Scotland).
- 2002 Rockefeller University (New York, USA), Institute for Advanced Studies (Princeton, USA).

OUTREACH

An overview of the impact of selected publications

Gómez-Rodríguez, C. & Ferrer-i-Cancho, R. (2017). Scarcity of crossing dependencies: a direct outcome of a specific constraint?

- Meet the Scientist Using Physics Techniques to Solve Linguistic Mysteries (January 3, 2018). Buzz Blog at Physics Central.

Gustison, M.L, Semple, S., Ferrer-i-Cancho, R. & Bergman, T. J. (2016). Gelada vocal sequences follow Menzerath's linguistic law.

- This Primate's Calls Obey a Linguistic Law by Christopher Intagliata on April 21, 2016. 60 - second science. Scientific American.
- Ethiopian monkey study offers clues into how human speech evolved. All things considered, National Public Radio (April 18, 2016).
- (in Catalan) *Micos i humans tenen semblances quan vocalitzen*. Ara (1 de maig del 2016).
- (in Catalan) *Les seqüències vocals de micos i humans comparteixen patró*. El Punt Avui (23 d'abril del 2016).

Kello, C. T., Brown, G. D. A., Ferrer-i-Cancho, R., Holden, G., Linkenkaer-Hansen, K., Rhodes, T. & Van Orden, G. C. (2010). Scaling laws in cognitive sciences.

- "Corpo e pensiero. L'attività è scandita da regole matematiche", by Massimo Piattelli-Palmarini on the Italian newspaper "Il Corriere della Sera" (14 September 2010).

Ferrer-i-Cancho, R., Riordan, O. & Bollobás, B. (2005). The consequences of Zipf's law for syntax and symbolic reference.

- Nature news and views, 7 March 2005.

Ferrer-i-Cancho, R. & Solé, R. V. (2003). Least effort and the origins of scaling in human language.

- Nature science update, 22 January 2003.
- "Law of conversations explained", by Siri Carpenter. Science Now, 22 January 2003.
- Awarded with the Barcelona City Research Prize 2003.

Ferrer-i-Cancho, R. & Lusseau, D. (2009). Efficient coding in dolphin surface behavioral patterns.

- The 1st author was interviewed for Superquark, the Italian prime time science TV program. Documentary "Erased words" ("*Parole cancellate*") from RAI Uno). Broadcasted on 26 August 2010.
- The 2nd author was interviewed (live) in the Channel 4 news (UK) in 2009 (August 3).
- The 1st author was interviewed on Onda Regional de Murcia (programa Adelantos), 31 July 2009.
- Selected by the Spanish Service of Information and Scientific News (SINC).

As popular science author (in Spanish)

- **Hernández-Fernández, A. & Ferrer-i-Cancho, R. (2019). *Lingüística quantitativa. La estadística de las palabras (Quantitative linguistics. The statistics of words)*. Grandes ideas de las matemáticas EMSE EDAPP y Prisanoticias Colecciones. Published also in **Italian** and **Romanian** (forthcoming in **Catalan** and **Portuguese**).**

As popular science author (in Catalan)

- (2023) amb A. Hernández Fernández. *Lingüística quantitativa i lleis lingüístiques. De la lingüística a la intel·ligència artificial i la tecnològica*. Terminàlia 27, 72-79.
- (2010). *Què tenen en comú els dofins dels fiords de Nova Zelanda i els macacos de Taiwan?* Revista Nodes (Butlletí de l'Associació Catalana d'Intel·ligència Artificial) 46, 16-17.
- (2009). *L'estalvi energètic a les llengües*. En *ressonància: noves fronteres de la ciència, l'art i el pensament*, C. Massip and J. Perelló (eds.) pp. 190-198
- (2006). *La llengua i el gènere* (Cartes del lector) El Periódico de Catalunya, dimecres 6 de desembre.
- (2004). *Sobre la singularitat del llenguatge humà*. El Temps (number 1041, May 2004). Based on the PhD thesis “Ferrer i Cancho, R. (2003). [Language: universals, principles and origins](#). PhD Thesis. Barcelona: Universitat Politècnica de Catalunya.

Other

- (in Spanish) *¿Sueñan los delfines con clases de inglés?* by Iñaki Berazaluze. Yorokobu 28 (April 2012), pp. 31.
- (in Catalan) *Llengües i sons dels animals podrien compartir característiques* by Michele Catanzaro. El Periódico (25 April 2011).

As organizer of popular science events:

- *Mysteries surrounding the origins of human language (Enigmes al voltant dels orígens del llenguatge humà)*. Evening of the Science Museum (“*Vespre del Museu de la Ciència*”). Science Museum (Barcelona), 11 March 2008.

EDITORIAL AND REVIEWER WORK

EDITORIAL BOARDS

2023-2025. Section editor of Encyclopedia of Language and Linguistics (3rd edition). Section “Interaction with Physics and Mathematics”.

- 2022 – Glottometrics.
- 2021 – Journal of Quantitative Linguistics. Indexed by Web of Science.
- 2019 – present Lingua (Elsevier).
- 2017 – present Linguistic Frontiers (De Gruyter).
- 2009 – 2022 Entropy (MDPI). Indexed by Web of Science.
- 2011 – 2020 Language Dynamics and Change (Brill). Indexed by Web of Science and Scopus.
- 2008 – 2010 Glottotheory. Currently published by Akademie Verlag.

PEER REVIEWER

Multidisciplinary science: - Proceedings of the National Academy of Sciences USA - PLoS ONE - Entropy Biology: - Proceedings of the Royal Society B - Acta Acustica united with Acustica - Biology Letters - Animal Behavior - Bioacoustics - Biosystems - Naturwissenschaften - Journal of Theoretical Biology - Bulletin of Mathematical Biology - Computational Biology and Chemistry - Journal of Bioinformatics and Sequence Analysis Physics: - Nature Communications Physics - Physical Review E - Journal of Statistical Mechanics: theory and experiment. - Europhysics Letters - European Physical Journal B - Physica A Complex Systems	Cognitive science: - Nature Human Behavior - Trends in Cognitive Sciences - Cognition - Cognitive Science - Psychonomic Bulletin and Review - Frontiers in Psychology - Journal of Psycholinguistic Research - Language Learning Linguistics: - Linguistic Vanguard, - Lingua - Interaction Studies - Digital Scholarship in the Humanities - Journal of Quantitative Linguistics - Language Sciences - Traitement Automatique des Langues Naturelles (TALN) 2014 - Evolution of Language Conference 2006, 2010, 2012, 2014, 2016, 2018 - Glottotheory - Book “Towards a theoretical framework for analyzing complex linguistic networks”, Mehler, A., Lücking, A.,
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- Complex & Intelligent Systems - Complexity (Wiley/Hindawi) - Advances in Complex Systems - European Conference on Complex Systems (ECCS) 2013 Philosophy - Erkenntnis	Banisch, S., Blanchard, P. & Job, B. (eds.). Springer (Berlin) - Corpus Linguistics and Linguistic Theory - Cambridge Encyclopaedia of the Language Sciences Computer science: - Transactions on Pattern Analysis and Machine Intelligence - Computer Speech and Language - Computational Linguistics - Neurocomputing - COLING 2018 Other: Cortex, Adaptive Behavior, Current Anthropology, Revista de Economía del ICE
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Reviewer for institutions

- Department of Psychology and Cognitive Science, University of Trento, Italy.
- Programa de Atracción de Talento, Comunidad de Madrid, Spain.
- Zukunftskolleg Fellowship Programme, University of Konstanz, Germany.
- National Science Foundation (USA)
- European Research Council
- Linguistics and Philosophy Departments/SASC, University of California, Santa Barbara
- Department of Population Health and Reproduction. School of Veterinary Medicine. Davis, California (USA).

Evaluation committee of PhD theses:

- M. Van Egmond, “Zipf’s law in aphasic speech”. University of Utrecht, 26 October 2018.
- I. Ros, “Minimizing dependencies across languages and speakers”. University of the Basque Country, 17 September 2018.
- R. Amato, “Human collective behavior models: language, cooperation and social conventions”. Universitat de Barcelona, 13 April 2018.
- F. Font-Clos, “On the scale invariance of certain complex systems”. Universitat Autònoma de Barcelona, 2 July 2015.

RESEARCH FUNDING AND RECOGNITIONS

As principal investigator (PI):

- 2022-2024. Support for research groups (AGRUPS). Funded by Universitat Politècnica de Catalunya (7.000€ in 2022, 5.000€ in 2023 and 2.657€ in 2024).
- 2021-2023. Quantitative, Mathematical and Computational Linguistics Research Group. Research group recognized by AGAUR (SGR 2021).
- (jointly with J. Larriba Pey) 2017-2019 Management and Analysis of Complex Data (*Gestión y análisis de datos complejos*). Funded by MINECO (138.303€). TIN2017-89244-R.
- 2017-2019 Management and Analysis of Complex Data. Research group recognized by AGAUR (SGR 2017).
- 2010-2012 Phase transitions in the genesis of communication (*Transicions de fase en la gènesi de la comunicació*). Funded by Universitat Politècnica de Catalunya (8000€). Ref. 0-INCREC-03.

Research contracts:

- 2021-2022 Research Agreement with Telefónica I+D (6500€). Researchers in charge: R. Ferrer-i-Cancho (UPC) & J. Luque Serrano (Telefónica I+D).

Participation in international research projects and programs:

- 2017 Search for Extraterrestrial Intelligence (SETI) Institute VI Call for White Papers: Search for Intelligent Life in the Universe, and the Creation of a Multidisciplinary Virtual Institute for SETI Research. Selected White Paper “What animal studies can tell us about detecting intelligent messages from outside Earth” (Kershenbaum et al.)
- 2017 Recruitment program of foreign experts (2017ZD070). Xi'an Jiaotong University). Funded by State Administration of Foreign Experts Affairs P. R. China. PI: X. Chen.
- 2005 ECAGents (Embodied communicating agents). Funded by European Union (7.12 Million €). Ref. FP6 - IST-2003-1940. PI: E. Nolfi.
- 2003-2004 COSIN (Coevolution and self-organization in dynamical networks). Funded by European Union (1.2 Million €). PI: G. Caldarelli

Participation in projects funded by Spanish or Catalan agencies:

- 2022-2024. Semantics of Catalan words (Semàntica de les paraules del català). Funded by Institut d'Estudis Catalans (5000 €). Ref. PRO-2022-S03-HERNANDEZ. PI: A. Hernández-Fernández.
- 2021. Applications of Quantitative Linguistics in Catalan (Aplicacions de la lingüística quantitativa en el català). Funded by Institut d'Estudis Catalans (3000 €). Ref. PRO-2021-S03-HERNANDEZ. PI: A. Hernández-Fernández.
- 2019-2020. Quantitative Linguistics (Lingüística quantitativa). Funded by Institut d'Estudis Catalans (6000 €). Ref. RCO03080. PI: A. Hernández-Fernández.
- 2014-2016 Management and Analysis of Complex Data (*Gestió i Anàlisi de Dades Complexes*). Funded by AGAUR (45.000€). Ref. 2014 SGR 890. PI: R. Gavalda.
- 2014-2016 Aprendizaje computacional y comunicación (APCOM). Funded by MINECO (74.700€). Ref. TIN2014-57226-P. PI: M. Arias & G. Morrill.
- 2012-2014 Data mining in biological and social data: algorithms, theory and implementation “*Minería en datos biológicos y sociales: algoritmos, teoría e implementación*”, BASMATI. Funded by MICINN (98.736€). Ref. TIN2011-27479-C04-03. PI: R. Gavalda.
- 2010-2013 Hybrid machine translation and advanced evaluation (*Traducción automática híbrida y evaluación avanzada*). Funded by MICINN (178.354€). Ref. TIN2009-14675-C03-03. PI: L. Màrquez.
- 2009-2011 Symbolic sequences: analysis, learning, mining and evolution (*Secuencias simbólicas: análisis, aprendizaje, minería y evolución*) SESAAME-BAR. Funded by MICINN (204.490€). Ref. TIN2008-06582-C03-01. PI: R. Gavalda.
- 2007-2009 Dynamic evolution of systems with non-linear interactions defined over complex networks. Theoretical development (*Evolución dinámica de sistemas con interacciones no lineales definidos en redes complejas. Desarrollo teórico*). Funded by MEDU - Ministerio de Educación y Ciencia (49.000,00€). Ref. FIS2006-13321-C02-01. PI: C. J. Pérez.
- 2006-2007. Connectivity effects and dynamics in biological and social networks (*Efectos de conectividad y dinámica en redes biológicas y sociales*). Funded by MCTE - Ministerio de Ciencia y Tecnología (49,200,00€). Ref. BFM2003-08258-C02-02. PI: A. Díaz-Guilera
- 2001-2003. Phase transitions and evolution of graphs in complex systems (*Transiciones de fase y evolución de grafos en sistemas complejos*). Funded by MCYT (48982,49 €). Ref. BFM2001-2154. PI: R. Vicente.
- 1997 Psychological validation of a neural model for language processing (*Validación psicológica de un modelo neuronal para el procesamiento del lenguaje*). Funded by MCYT. PI: J. Sopena

SOFTWARE

[The Linear Arrangement Library](#) (2021). A library in Python and C++ for research in quantitative dependency syntax and related fields (as PI and designer; jointly with L. Alemany-Puig and J. L. Esteban).

PUBLICATION RECORD

SUMMARY (full publication list at the end of this document)

(Co)author of 128 publications	9110 citations , 41 h-index (Google Scholar)
78 publications as 1st author (marked with * below). 18 diamond open access publications.	94 are indexed within Web of Science.

Milestones: 2 articles in PNAS (IF 12.2), 2 articles in Trends in Cognitive Sciences (IF 15.4) and 1 article in Trends in Ecology and Evolution (IF 17.5).

SELECTED CONTRIBUTIONS TO SCIENCE

The dependency distance(=length) minimization hypothesis, the (dependency) distance minimization principle and the 1st baselines for research on dependency distance e.g.

- Ferrer-i-Cancho, R. (2004). Euclidean distance between syntactically linked words.

A powerful optimality score for dependency distances and a ranking method for quantitative typology:

- Ferrer-i-Cancho, R., Gómez-Rodríguez, Esteban, J.L. & Alemany-Puig, L. (2022). Optimality of syntactic dependency distances.

The hypothesis that constraints on crossing dependencies in syntactic structures are epiphenomena of memory limitations, e.g.,

- Gómez-Rodríguez, C., Christiansen, M. & Ferrer-i-Cancho, R. (2022). Memory limitations are hidden in grammar.
- Gómez-Rodríguez, C. & Ferrer-i-Cancho, R. (2017). Scarcity of crossing dependencies: a direct outcome of a specific constraint?
- Ferrer-i-Cancho, R. (2014). A stronger null hypothesis for crossing dependencies.
- Ferrer-i-Cancho, R. (2006). Why do syntactic links not cross?

A unified theory of word order variation and word order change

- Ferrer-i-Cancho R. (2016). Kauffman's adjacent possible in word order evolution.
- Ferrer-i-Cancho, R. (2015). The placement of the head that minimizes online memory. A complex systems approach.

A unified theory of linguistic laws (Zipf's law for word frequencies, Zipf's law of abbreviation, Menzerath's law, Zipf's laws of meaning)

- Ferrer-i-Cancho, R., Bentz, C & Seguin, C. (2022). Optimal coding and the origins of Zipfian laws.
- Ferrer-i-Cancho, R. & Vitevitch, M. S. (2018). The origins of Zipf's meaning-frequency law.
- Ferrer-i-Cancho, R. (2016). Compression and the origins of Zipf's law for word frequencies.
- Gustison, M.L, Semple, S., Ferrer-i-Cancho, R. & Bergman, T. J. (2016). Gelada vocal sequences follow Menzerath's linguistic law.

A family of information theoretic models of Zipf's law for word frequencies

- Ferrer-i-Cancho, R. & Solé, R. V. (2003). Least effort and the origins of scaling in human language.
- Ferrer-i-Cancho, R. (2005). Zipf's law from a communicative phase transition.

Statistical similarities between human language and the behavior of other species (dolphins, macaques, geladas) and genomes. e.g.:

- Gustison, M.L, Semple, S., Ferrer-i-Cancho, R. & Bergman, T. J. (2016). Gelada vocal sequences follow Menzerath's linguistic law.
- Ferrer-i-Cancho, R., Forns, N., Hernández-Fernández, A., Bel-Enguix, G. & Baixeries, J. (2013). The challenges of statistical patterns of language: the case of Menzerath's law in genomes.
- Ferrer-i-Cancho, R. & McCowan, B. (2012). The span of correlations in dolphin whistle sequences.
- Ferrer-i-Cancho, R. & Lusseau, D. (2009). Efficient coding in dolphin surface behavioral patterns.

The core and peripheral lexicon hypothesis:

- Hernández-Fernández, A. & Ferrer-i-Cancho, R. (2016). The infochemical core.
- Ferrer-i-Cancho, R. & Solé, R. V. (2001). Two regimes in the frequency of words and the origin of complex lexicons: Zipf's law revisited.

The language for free hypothesis (a rudimentary form of language as a side-effect of the internal organization of the lexicon) and the role of ambiguity in language

- Ferrer-i-Cancho, R., Riordan, O. & Bollobás, B. (2005). The consequences of Zipf's law for syntax and symbolic reference.
- Baixeries, J., Elvevåg, B. & Ferrer-i-Cancho, R. (2013). The evolution of the exponent of Zipf's law in language ontogeny.
- Ferrer-i-Cancho, R. (2006). When language breaks into pieces. A conflict between communication through isolated signals and language.

SCIENTIFIC DEBATES

As recipient of commentaries

On word order 1

- Ferrer-i-Cancho, R. (2008). Some word order biases from limited brain resources. A mathematical approach. *Advances in Complex Systems* 11 (3), 394-414.
- Cysouw, M. (2008). Linear order as a predictor of word order regularities. A reply to Ferrer-i-Cancho (2008). *Advances in Complex Systems* 11 (3), 415-420.
- Ferrer-i-Cancho, R. (2008). Some limits of standard linguistic typology. The case of Cysouw's models for the frequencies of the six possible orderings of S, V and O. *Advances in Complex Systems* 11 (3), 421-432.

On word order 2

- Ferrer-i-Cancho, R. (2015). The placement of the head that minimizes online memory. A complex systems approach. *Language Dynamics and Change* 5 (1), 114-137.
- Alday, P. (2015). Be careful when assuming the obvious. Commentary on "The placement of the head that minimizes online memory: a complex systems approach". *Language Dynamics and Change* 5 (1), 138-146.
- Ferrer-i-Cancho, R. (2015). Reply to the commentary "Be careful when assuming the obvious", by P. Alday. *Language Dynamics and Change* 5 (1), 147-155.

On Menzerath's law in genomes

- Ferrer-i-Cancho, R. & Forns, N. (2009). The self-organization of genomes. *Complexity* 15 (5), 34-36.
- Solé, R. V. (2010). Genome size, self-organization and DNA's dark matter. *Complexity* 16 (1), 20-23.

- Ferrer-i-Cancho, R., Forns, N., Hernández-Fernández, A., Bel-Enguix, G. & Baixeries, J. (2013). The challenges of statistical patterns of language: the case of Menzerath's law in genomes. *Complexity* 18 (3), 11–17.

As source of commentaries or critical reviews

On phrase structure grammar:

- Nelson, M. J., et al (2017). Neurophysiological dynamics of phrase-structure building during sentence processing. *Proceedings of the National Academy of Sciences USA* 114(18), E3669-E3678.
- Chen, X, Gómez-Rodríguez, C. & Ferrer-i-Cancho, R. (2018). A dependency look at the reality of constituency. *Glottometrics* 40, 104-106.

On word order and 20th century linguistics:

- Futrell, R., Mahowald, K., & Gibson, E. (2015). Large-scale evidence of dependency length minimization in 37 languages. *Proceedings of the National Academy of Sciences* 112(33), 10336-10341.
- Ferrer-i-Cancho, R. & Gómez-Rodríguez, C. (2016). Liberating language research from dogmas of the 20th century. *Glottometrics* 33, 33-34.
- Futrell, R., Mahowald, K. & Gibson, E. Response to Liu, Xu, and Liang (2015) and Ferrer-i-Cancho and Gómez-Rodríguez (2015) on dependency length minimization. *Glottometrics* 33, 39-44.

On the uniform information density and similar hypotheses (widely followed in cognitive science):

- (one example of many targets) Piantadosi, S.T., Tily, H., & Gibson, E. (2013). Word lengths are optimized for efficient communication. *Proceedings of the National Academy of Sciences* 108 (9), 3526–3529.
- Ferrer-i-Cancho, R. & Moscoso del Prado Martín, F. (2011). Information content versus word length in random typing. *Journal of Statistical Mechanics*, L12002.
- Ferrer-i-Cancho, R., Dębowski, L. & Moscoso del Prado Martín, F. (2013). Constant conditional entropy and related hypotheses. *Journal of Statistical Mechanics*, L07001.

On the law of abbreviation in primates

- Bezerra, B.M., Souto, A. S. Radford, A.N. & Jones, G. (2011). Brevity is not always a virtue in primate communication. *Biology Letters* 7, 23-25.
- Ferrer-i-Cancho, R. & Hernández-Fernández, A. (2013). The failure of the law of brevity in two New World primates. *Statistical caveats. Glottotheory* 4 (1), 45-55.

On Zipf's law and random typing

- Miller, G. A. & Chomsky, N. (1963). Finitary models of language users. In: Luce, R. D., Bush, R., & Galanter, E., (eds.), *Handbook of Mathematical Psychology*, volume 2, pages 419-491. New York: Wiley.
- Li, W. (1992). Random texts exhibit Zipf's-law-like word frequency distribution. *IEEE Transactions on Information Theory* 38, 1842-1845.
- Ferrer-i-Cancho, R. & Elvevåg, B. (2010). Random texts do not exhibit the real Zipf's law-like rank distribution. *PLoS ONE* 5 (3), e9411.

As commentator of long reviews

- Ferrer-i-Cancho, R. (2017). A commentary on "The now-or-never bottleneck: a fundamental constraint on language", by Christiansen and Chater (2016). *Glottometrics* 38, 107-111.
- Ferrer-i-Cancho, R. (2014). Beyond description. Comment on "Approaching human language with complex networks" by Cong & Liu. *Physics of Life Reviews* 11 (4), 621–623.

ALL SCIENCE PUBLICATIONS¹ (high impact journals indicated in bold type)

1. *Ferrer-i-Cancho, R. & Arias, M. (2024). Who is the root in a syntactic dependency structure? <https://arxiv.org/abs/2501.15188>
2. *Ferrer-i-Cancho, R. (2024). The exponential distribution of the orders of demonstrative, numeral, adjective and noun. <https://arxiv.org/abs/2502.06342>
3. *Ferrer-i-Cancho, R. (2024). Predictability maximization and the origins of word order harmony. <https://arxiv.org/abs/2408.16570>
4. Komori, S., Sugiura, M., Ferrer-i-Cancho, R. & Alemany-Puig, L. & Li, W. (2024). Syntactic development and optimality of dependency distances for Japanese as a second language.
5. Safryghin, A., Badihi, G., Ferrer-i-Cancho, R., Grund, C., Hayashi, M., Soldati, A., Rodrigues, E.D., Zuberbühler, K. & Hobaiter C. (2024). Variation in the emergence Zipf's law of brevity patterns in chimpanzee gestures.
6. Franco-Sánchez, V., Martí-Llobet, A. & Ferrer-i-Cancho, R. (2024). Swap distance minimization beyond entropy minimization in word order variation. <http://arxiv.org/abs/2404.14192>
7. *Ferrer-i-Cancho, R. (2024). The optimal placement of the head in the noun phrase. The case of demonstrative, numeral, adjective and noun. *Journal of Quantitative Linguistic* 32(1), 26–53.
8. Alemany-Puig, L. & Ferrer-i-Cancho, R. (2024). The expected sum of edge lengths in planar linearizations of trees. *Theory and applications. Journal of Language Modelling* 12 (1), 1–42.
9. Alemany-Puig, L., Esteban, J. L & Ferrer-i-Cancho, R. (2023). On the Maximum Linear Arrangement Problem for trees, <https://arxiv.org/abs/2312.04487>.
10. *Ferrer-i-Cancho, R. & Namboodiripad, S. (2023). Swap distance minimization in SOV languages. *Glottometrics* 55, 59-88.
11. Alemany-Puig, L., Esteban, J. L & Ferrer-i-Cancho, R. (2024). The Maximum Linear Arrangement Problem for trees under projectivity and planarity, *Information Processing Letters* 183, 106400.
12. Petrini, S., Casas-i-Muñoz, A., Cluet-i-Martinell, J., Wang, M., Bentz, C. & Ferrer-i-Cancho, R. (2023). Direct and indirect evidence of compression of word lengths. Zip's law of abbreviation revisited. *Glottometrics* 54, 58-87.
13. Petrini, S. & Ferrer-i-Cancho, R. (2023). The distribution of syntactic dependency distances. <https://arxiv.org/abs/2211.14620>

¹ See research on teaching and outreach for other publications. Excluding abstracts in proceedings.

14. Petrini, S., Casas-i-Muñoz, A., Cluet-i-Martinell, J., Wang, M., Bentz, C. & Ferrer-i-Cancho, R. (2023). The optimality of word lengths. Theoretical foundations and an empirical study. <https://arxiv.org/abs/2208.10384>
15. Safryghin, A., Cross, C., Fallon, B., Heesen, R., Ferrer-i-Cancho, R. & Hobaiter, C. (2022). Variable expression of linguistic laws in ape gesture: a case study from chimpanzee sexual solicitation. *Royal Society Open Science* 9, 220849.
16. Gómez-Rodríguez, C., Christiansen, M. & Ferrer-i-Cancho, R. (2022). Memory limitations are hidden in grammar. *Glottometrics* 52, 39-64.
17. *Ferrer-i-Cancho, R., Lusseau, D. & McCowan, B. (2022). Parallels of human language in the behavior of bottlenose dolphins. *Linguistic Frontiers* 5(1), 1-7.
18. *Ferrer-i-Cancho, R., Bentz, C. & Seguin, C. (2022). Optimal coding and the origins of Zipfian laws. *Journal of Quantitative Linguistics* 29(2), 165-194.
19. Semple, S., Ferrer-i-Cancho, R. & Gustison, M. (2022). Linguistic laws in biology. *Trends in Ecology and Evolution* 37(1), 53-66.
20. Alemany-Puig, L., Esteban, J. L. & Ferrer-i-Cancho, R. (2022). Minimum projective linearizations of trees in linear time. *Information Processing Letters* 74, 106204.
21. Alemany-Puig, L. & Ferrer-i-Cancho, R. (2022). Linear time calculation of the expected sum of edge lengths in projective linearizations of trees. *Journal of Computational Linguistics* 48 (3): 491–516.
22. *Ferrer-i-Cancho, R., Gómez-Rodríguez, C., Esteban, J.L. & Alemany-Puig, L. (2022). Optimality of syntactic dependency distances. *Physical Review E* 105, 014308.
23. *Ferrer-i-Cancho, R. & Gómez-Rodríguez, C. (2021). Dependency distance minimization predicts compression. *Proceedings of the Second Workshop on Quantitative Syntax (Quasy, SyntaxFest 2021)*, 45-57.
24. Alemany-Puig, L., Esteban, J. L. & Ferrer-i-Cancho, R. (2021). The linear arrangement library. A new tool for research on syntactic dependency structures. *Proceedings of the Second Workshop on Quantitative Syntax (Quasy, SyntaxFest 2021)*, 1-16.
25. Català, N., Baixeries, J., Ferrer-i-Cancho, R., Padró, L. & Hernández-Fernández, A. (2021). Zipf's law of meaning in Catalan, *PLoS ONE*, 16(12), e0260849.
26. Carrera-Casado, D. & Ferrer-i-Cancho, R. (2021). The advent and fall of a vocabulary learning bias from communicative efficiency. *Biosemitotics* 14, 345-375.
27. *Ferrer-i-Cancho, R. & Gómez-Rodríguez (2021). Anti dependency distance minimization in short sequences. A graph theoretic approach. *Journal of Quantitative Linguistics* 28 (1), 50-76.
28. *Ferrer-i-Cancho, R., Gómez-Rodríguez, C. & Esteban, J.L. (2021). Bounds of the variation of the sum of edge lengths in linear arrangements of trees. *Journal of Statistical Mechanics*, 023403.
29. Alemany-Puig, L. & Ferrer-i-Cancho, R. (2020). Fast calculation of the variance of edge crossings in random linear arrangements. <https://arxiv.org/abs/2003.03258>
30. Corral, A., Serra, I. & Ferrer-i-Cancho, R. (2020). Distinct flavors of Zipf's law and its maximum likelihood fitting: Rank-size and size-distribution representations. *Physical Review E* 102, 052113.
31. Alemany-Puig, L. & Mercè, M. & Ferrer-i-Cancho, R. (2020). Reappraising the distribution of the number of edge crossings of graphs on a sphere. *Journal of Statistical Mechanics*, 083401.
32. Alemany-Puig, L. & Ferrer-i-Cancho, R. (2020). Edge crossings in random linear arrangements, *Journal of Statistical Mechanics*, 023403.
33. *Ferrer-i-Cancho, R. (2019). The sum of edge lengths in random linear arrangements, *Journal of Statistical Mechanics*, 053401.
34. Heesen, R., Hobaiter, C., Ferrer-i-Cancho, R., Semple, S. (2019). Linguistic laws in chimpanzee gestural communication. *Proceedings of the Royal Society B: Biological Sciences*, 20182900.
35. Casas, B., Hernández-Fernández, A., Català, N., Ferrer-i-Cancho, R. & Baixeries, J. (2019). Polysemy and brevity versus frequency in language, *Computer Speech and Language* 58, 19-50.
36. *Ferrer-i-Cancho, R., Bentz, C. & Seguin, C. (2018). Compression and the origins of Zipf's law of abbreviation. <http://arxiv.org/abs/1504.04884>
37. Casas, B., Català, N., Ferrer-i-Cancho, R., Hernández-Fernández, A. & Baixeries, J. (2018). The polysemy of the words that children learn over time. *Interaction Studies* 19 (3), 389-426.
38. *Ferrer-i-Cancho, R. & Vitevitch, M. S. (2018). The origins of Zipf's meaning-frequency law. *Journal of the Association for Information Science and Technology* 69 (11), 1369-1379.
39. Hernández-Fernández, A. & Ferrer-i-Cancho, R. (2018). José María de Oleza Arredondo, S.J. (1887-1975). *Glottometrics* 41, 80-86.
40. Chen, X., Gómez-Rodríguez, C. & Ferrer-i-Cancho, R. (2018). A dependency look at the reality of constituency. *Glottometrics* 40, 104-106.
41. *Ferrer-i-Cancho, R., Gómez-Rodríguez, C. & Esteban, J. L. (2018). Are crossing dependencies really scarce? *Physica A* 493, 311-329.
42. *Ferrer-i-Cancho, R. (2018). Optimization models of natural communication. *Journal of Quantitative Linguistics* 25 (3), 207-237.
43. Gómez-Rodríguez, C. & Ferrer-i-Cancho, R. (2017). The scarcity of crossing dependencies: a direct outcome of a specific constraint? *Physical Review E* 96, 062304.
44. Elvevåg, B., Foltz, P., Rosenstein, M., Ferrer-i-Cancho, R., De Deyne, S., Mizraji, E. & Cohen, A. (2017). Thoughts about disordered thinking: measuring and quantifying the laws of order and disorder. *Schizophrenia Bulletin* 43 (3), 509–513.
45. *Ferrer-i-Cancho, R. (2017). Towards a theory of word order. Comment on "Dependency distance: a new perspective on syntactic patterns in natural language" by Haitao Liu et al. *Physics of Life Reviews* 21, 218-220.
46. *Ferrer-i-Cancho, R. (2017). The placement of the head that maximizes predictability. An information theoretic approach. *Glottometrics* 39, 38-71.
47. Bentz, C., Alikaniotis, D., Cysouw, M. & Ferrer-i-Cancho, R. (2017). The entropy of words – learnability and expressivity across more than 1000 languages. *Entropy* 19(6), 275.
48. Esteban, J. L. & Ferrer-i-Cancho, R. (2017). A correction on Shiloach's algorithm for minimum linear arrangement of trees. *SIAM Journal of Computing* 46(3), 1146-1151.
49. *Ferrer-i-Cancho, R. (2017). A commentary on “The now-or-never bottleneck: a fundamental constraint on language”, by Christiansen and Chater (2016). *Glottometrics* 38, 107-111.
50. *Ferrer-i-Cancho, R. (2017). Random crossings in dependency trees. *Glottometrics* 37, 1-12.
51. *Ferrer-i-Cancho, R. (2016). The optimality of attaching unlinked labels to unlinked meanings. *Glottometrics* 36, 1-16.
52. *Ferrer-i-Cancho, R. (2016). The meaning-frequency law in Zipfian optimization models of communication. *Glottometrics* 35, 28-37.

53. *Ferrer-i-Cancho, R. (2016). Compression and the origins of Zipf's law for word frequencies. *Complexity* 21, 409-411.
54. *Ferrer-i-Cancho, R. & Gómez-Rodríguez, C. (2016). Crossings as a side effect of dependency lengths. *Complexity* 21, 320-328.
55. Hernández-Fernández, A., Casas, B., Ferrer-i-Cancho, R. & Baixeries, J. (2016). Testing the robustness of laws of polysemy and brevity versus frequency. 4th International Conference on Statistical Language and Speech Processing (SLSP 2016). P. Král and C. Martín-Vide (eds.). LNAI 9918, pp. 1–11.
56. Lozano, A., Casas, B., Bentz, C. & Ferrer-i-Cancho, R. (2016). Fast calculation of entropy with Zhang's estimator. In: *Issues in Quantitative Linguistics 4. Dedicated to Reinhard Köhler on the occasion of his 65th birthday*, E. Keli, R. Knight, J. Macutek and A. Wilson (eds.). No. 23 of the series "Studies in Quantitative Linguistics". Lüdenscheid: RAM-Verlag. pp. 273-285.
57. Esteban, J. L., Ferrer-i-Cancho, R., & Gómez-Rodríguez, C. (2016). The scaling of the minimum sum of edge lengths in uniformly random trees. *Journal of Statistical Mechanics*, 063401.
58. Gustison, M.L, Semple, S., Ferrer-i-Cancho, R. & Bergman, T. J. (2016). Gelada vocal sequences follow Menzerath's linguistic law. **Proceedings of the National Academy of Sciences USA** 113 (19), E2750-E2758.
59. *Ferrer-i-Cancho R. (2016). Kauffman's adjacent possible in word order evolution. In S.G. Roberts, C. Cuskley, L. McCrohon, L. Barceló-Coblijn, O. Feher & T. Verhoef (eds.). *The Evolution of Language: Proceedings of the 11th International Conference (EVLANG11)*. New Orleans, USA, March 21-24.
60. *Ferrer-i-Cancho, R. (2016). Non-crossing dependencies: least effort, not grammar. In: *Towards a theoretical framework for analyzing complex linguistic networks*, Mehler, A., Lücking, A., Banisch, S., Blanchard, P. & Job, B. (eds.). Springer (Berlin), pp. 203-234.
61. Hernández-Fernández, A. & Ferrer-i-Cancho, R. (2016). The infochemical core. *Journal of Quantitative Linguistics* 23 (2), 133-153.
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