

## SHORT BIO



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## 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, Italian and French.

## EMPLOYMENT AND POSITIONS

- July 2011 – present. Associate professor (tenured). Department of Computer Languages and Systems. Universitat Politècnica de Catalunya (Barcelona).
- August 2007 – July 2011. Lecturer. Same department.
- January 2006 – August 2007 “Juan de la Cierva” postdoctoral fellow at the PhysComp<sup>2</sup> (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

- 2014-present Council member at large of the International Quantitative Linguistics Association (IQLA).
- 2008-present Member of the permanent committee of the Evolution of Language Conference (EVOLANG).

Local coordinator EVOLANG 7 (Barcelona, 2008).

## TEACHING EXPERIENCE

- 2013-present (as professor and coordinator) Complex and Social Networks (Master in Innovation and Research in Informatics, Universitat Politècnica de Catalunya = UPC)
- 2010-present Introduction to Programming II (Degree in Computer Science, UPC)
- 2009-2010 Compilers (Degree in Computer Science, UPC)
- 2007-2008 Introduction to Programming I (Degree in Computer Science, UPC)
- 2007-2007 Classic Mechanics Laboratory (Degree in Physics, Universitat de Barcelona)

## SELECTED SCIENTIFIC CONTRIBUTIONS

- Information theory of language and animal behavior, including a family of models of Zipf's law for word frequencies (Ferrer-i-Cancho & Solé 2003, Ferrer-i-Cancho 2005, Prokopenko et al 2010) and a model for Zipf's law of abbreviation (Ferrer-i-Cancho et al 2013b).
- Word order theory including a hypothesis for the low frequency of syntactic dependency crossings (discontinuity) in language (Ferrer-i-Cancho 2014a) and the hypothesis of a permutation ring structure for word evolution (Ferrer-i-Cancho 2014b).
- Statistical similarities between human language, the animal behavior and genomes (e.g, Ferrer-i-Cancho & Lusseau Complexity 2009, Ferrer-i-Cancho & McCowan 2012, Ferrer-i-Cancho et al 2013a).
- Evidence of the weakness of the view of statistical laws of language as lacking depth or utility (e.g., Ferrer i Cancho & Elvevåg 2010, Ferrer-i-Cancho et al. 2013a).
- The language for free hypothesis: a rudimentary form of language as a side-effect of the internal organization of the lexicon (Ferrer-i-Cancho, Riordan & Bollobás 2005, Baixeries et al 2013).
- The core and peripheral lexicon hypothesis (Ferrer-i-Cancho & Solé 2001; Petersen et al, 2012).

## ADVISED PHD THESES

- 2014 "*Las leyes de la lingüística en los sistemas de comunicación*" ("*The laws of linguistics in communication systems*") by Antoni Hernández-Fernández (advised jointly with Faust Diéguez-Vide).

## PUBLICATIONS

- (Co)author of about 75 publications (about 45 are indexed within the ISI Web of Science).
- Some popular publications:
  - Ferrer-i-Cancho (2014a). Editor's choice article 2014.
  - Baronchelli et al (2013). A review of research on complex networks for the cognitive sciences (Journal Impact Factor (JCR 2013): 21.147; 1<sup>st</sup> quartile).
  - Kello et al. (2010). Journal Impact Factor (JCR 2009): 11.664; 1<sup>st</sup> quartile. Massimo Piattelli-Palmarini wrote an article on it for the Italian newspaper "Il Corriere della Sera" (published in September 14, 2010).
  - Ferrer-i-Cancho & Lusseau (2009). The article was selected by the Spanish Service of Information and Scientific News. The 1<sup>st</sup> author was interviewed for Superquark, the Italian prime time science TV program. Broadcasted on August 26, 2010. The 2<sup>nd</sup> author was interviewed (live) in the Channel 4 news (UK) in 2009 (August 3).
  - Ferrer-i-Cancho & Solé (2003). Journal impact factor: 9.432; rank 3 in multidisciplinary sciences; 99 citations. This article was commented in Nature and Science and awarded with the Barcelona City Research Prize 2003 (a price for the best scientific research by Catalan researchers).

## EDITOR OF JOURNALS

- 2009 – present Entropy (within ISI Web of Science). MDPI.
- 2011 – present Language Dynamics and Change. Brill.
- 2008 – 2010 Glottotheory. Currently published by Akademie Verlag.

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## REFERENCES

- Baixeries, J., Elvevåg, B. & Ferrer-i-Cancho, R. (2013). The evolution of the exponent of Zipf's law in language ontogeny. PLoS ONE 8 (3), e53227.
- Baronchelli, A., Ferrer-i-Cancho, R., Pastor-Satorras, R., Chater, N. & Christiansen, M. H. (2013). Networks in cognitive science. Trends in Cognitive Sciences 17, 348-360.
- Dickman, R., Moloney, N. R., Altmann, E.G. (2012). Analysis of an information-theoretic model for communication. Journal of Statistical Mechanics: Theory and Experiment, P12022.
- Ferrer i Cancho, R. (2005). Zipf's law from a communicative phase transition. European Physical Journal B 47, 449-457.

- Ferrer-i-Cancho, R. (2014a). A stronger null hypothesis for crossing dependencies. *Europhysics Letters* 108 (5), 58003.
- Ferrer-i-Cancho, R. (2014b). The placement of the head that minimizes online memory: a complex systems approach. *Language Dynamics and Change*.
- 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.
- Ferrer-i-Cancho, R., Forns, N., Hernández-Fernández, A., Bel-Enguix, G. & Baixeries, J. (2013a). The challenges of statistical patterns of language: the case of Menzerath's law in genomes. *Complexity* 18 (3), 11–17.
- Ferrer-i-Cancho, R., Hernández-Fernández, A., Lusseau, D., Agoramoorthy, G., Hsu, M. J. & Semple, S. (2013b). Compression as a universal principle of animal behavior. *Cognitive Science* 37 (8), 1565–1578.
- Ferrer-i-Cancho, R. & Lusseau, D. (2009). Efficient coding in dolphin surface behavioral patterns. *Complexity* 14 (5), 23-25.
- Ferrer-i-Cancho, R. & McCowan, B. (2012). The span of correlations in dolphin whistle sequences. *Journal of Statistical Mechanics: Theory and Experiment*, P06002.
- Ferrer i Cancho, R., Riordan, O. & Bollobás, B. (2005). The consequences of Zipf's law for syntax and symbolic reference. *Proceedings of the Royal Society of London Series B* 272, 561-565.
- 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. *Journal of Quantitative Linguistics* 8, 165-173.
- Ferrer i Cancho, R. & Solé, R. V. (2003). Least effort and the origins of scaling in human language. *Proceedings of the National Academy of Sciences USA*. 100, 788-791.
- 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. *Trends in Cognitive Sciences* 14 (5), 223-232.
- Petersen, A. M., Tenenbaum, J., Havlin, S., Stanley, H. E., Perc, M. (2012). Languages cool as they expand: Allometric scaling and the decreasing need for new words. *(Nature) Scientific Reports* 2, 943.
- Prokopenko, M., Ay, N., Obst, O. & Polani, D. (2010). Phase transitions in least-effort communications. *Journal of Statistical Mechanics: Theory and Experiment*, P11025.