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**Summary:** I am Research Assistant Professor at the USC Department of Computer Science, Research Leader at the USC Information Sciences Institute, PI and Co-Director of the *Machine Intelligence and Data Science* (MINDS) hub at USC/ISI. My research advances AI and Machine Learning to model and predict human behavior in techno-social systems. I received the **DARPA Young Faculty Award** and I am a recipient of the **Complex System Society Junior Scientific Award**. I am Principal Investigator of projects in excess of **6 million dollars**, and Co-PI of projects in excess of **13 million dollars**. I currently support and supervise three postdocs and 8 PhD students in my lab. More info at: <http://emilio.ferrara.name/>

- **Research Assistant Professor** — USC Department of Computer Science  
**Research Leader** — USC Information Sciences Institute (ISI)  
**University of Southern California:** Viterbi School of Engineering — Marina del Rey, California, CA (USA)  
Dates: 08/2015–present
- **Senior Fellow** — Institute for Pure & Applied Mathematics (IPAM)  
**University of California Los Angeles** — Los Angeles, California, CA (USA)  
Dates: 01/2016–06/2016
- **Research Assistant Professor** — School of Informatics and Computing  
**Assistant Research Scientist** — Indiana University Network Science Institute (IUNI)  
**Indiana University** — Bloomington, IN (USA)  
Dates: 01/2015–07/2015
- **Postdoctoral Research Fellow** — School of Informatics and Computing  
**Indiana University**, Bloomington, IN (USA)  
Dates: 04/2012–12/2014
- **Visiting Researcher** — Royal Holloway University of London (UK) — Dates: 08/2011–03/2012
- **Visiting Researcher** — Vienna University of Technology (AU) — Dates: 01/2010–06/2010

## Sponsored Research Awards

- 2017-21 *COSINE: Cognitive Online Simulation of Information Network Environments*  
**Principal Investigator:** This project is funded by **DARPA SocialSim**  
Total amount: **\$4.95 millions**
- 2016-19 *MITIGATE: Modeling Individual Trajectories and Incentives in Gamified Techno-social Systems*  
**Principal Investigator:** This project is funded by the **DARPA Young Faculty Award 2016**  
Total amount: **\$1,000,000**
- 2017-21 *TILES: Tracking Individual performance with Sensors*  
**Co-Principal Investigator:** This project is funded by **IARPA MOSAIC**  
Total amount: **\$12.3 millions** – Collaborators: Shri Narayanan (PI, USC); Kristina Lerman (Co-PI, USC/ISI)
- 2017-20 *Digital deception: the cognitive and social mechanisms of the spread of fake news*  
**Co-Principal Investigator:** This project is funded by the **U.S. Air Force Office of Scientific Research**  
Total amount: **\$618,000** – Collaborators: Kristina Lerman (PI, USC/ISI)
- 2015-16 *DOISAC: Detecting Orchestrated Information and Synthetic Account Campaigns* (ONR)  
**Principal Investigator:** This project is funded by the **U.S. Office of Naval Research**  
Total awarded amount: **\$150,000**
- 2016-17 *SenseSaMo: the digital observatory for real-time monitoring of well-being in the city of Santa Monica*  
**Principal Investigator:** This project is funded by City of Santa Monica  
Total awarded amount: **\$50,000**
- 2016-17 *Enhancing e-cigarette surveillance with Twitter data*  
**Co-Principal Investigator:** This project is funded by the Tobacco Center of Regulatory Science  
Total awarded amount: **\$40,000** - Collaborators: Jon-Patrick Allem (PI)
- 2017-19 *Summer School Series on Methods for Computational Social Sciences*  
**Co-Principal Investigator:** This project is funded by the Volkswagen Foundation  
Total awarded amount: **\$260,000** - Collaborators: Claudia Wagner (PI, GESIS Leibniz Institute for the Social Sciences, Germany), Michael Macy (Cornell University, USA), Nicola Perra (Greenwich U., UK)

2017-19 *SAGE: Synergistic Anticipation of Geopolitical Events*

**Key Personnel:** This project is funded by the U.S. Intelligence Advanced Research Projects Activity  
Collaborators: Aram Galstyan (PI, USC/ISI)

2016-19 *EFFEKT: Effectively Forecasting Evolving Cyber Threats* (IARPA)

**Key Personnel:** This project is funded by the U.S. Intelligence Advanced Research Projects Activity  
Collaborators: Kristina Lerman (PI), Craig Knoblock (co-PI)

2016-17 *SAFE: SIGINT-based Anticipation of Future Events* (IARPA)

**Key Personnel:** This project is funded by the U.S. Intelligence Advanced Research Projects Activity  
Collaborators: Aram Galstyan (co-PI)

2015-16 *Situational awareness for social media* (DARPA)

**Key Personnel:** This project is funded by the U.S. Defense Advanced Research Projects Agency  
Collaborators: Aram Galstyan (PI)

2012-15 *Detecting early signatures of persuasion in information cascades* (DARPA)

**Key Personnel:** This project is funded by the U.S. Defense Advanced Research Projects Agency  
Collaborators: Alessandro Flammini (PI), Filippo Menczer (co-PI)

## Publications [Google Scholar: $\approx$ 3,000 citations; h-index=32; <http://goo.gl/uEHS7U>]

◇ identifies highly cited papers or top publications

### Peer-reviewed Journal Publications [Impact Factors in brackets]

1. K Lerman, L G Marin, M Arora, L Lima, **E Ferrara**, D Garcia. **Language, Demographics, and Emotions Shape Online Social Networks.** *Journal of Computational Social Science*, 1 (1), 209-225, 2018.
2. JP Allem, **E Ferrara**, SP Uppu, TB Cruz, JB Unger. **E-Cigarette Surveillance With Social Media Data: Social Bots, Emerging Topics, and Trends.** *JMIR Public Health Surveill*, 3(4):e98, 2017. [5.175]
3. B Mönsted, P Sapiezynski, **E Ferrara**, S Lehmann. **Evidence of Complex Contagion of Information in Social Media: An Experiment Using Twitter Bots.** *Plos One*, 12(9):e0184148, 2017. [3.057]
4. **E Ferrara**. **Disinformation and Social Bot Operations in the Run Up to the 2017 French Presidential Election.** *First Monday* 22(8), 2017.
5. **E Ferrara**. **Contagion dynamics of extremist propaganda in social networks.** *Information Sciences* 418-419:1-12, 2017. [3.364]
6. O Varol, **E Ferrara**, F Menczer, A Flammini. **Early Detection of Promoted Campaigns on Social Media.** *EPJ Data Science* 6(13), 2017. [1.567]
- ◇ 7. **E Ferrara**, O Varol, CA Davis, F Menczer, A Flammini. **The rise of Social Bots.** *Communications of the ACM* 59(7):96-104, 2016. [3.301]
- ◇ 8. A Bessi, **E Ferrara**. **Social bots distort the 2016 U.S. Presidential election online discussion.** *First Monday*, 21(11), 2016.
- ◇ 9. VS Subrahmanian, A Azaria, S Durst, V Kagan, A Galstyan, K Lerman, L Zhu, **E Ferrara**, A Flammini, F Menczer. **The DARPA Twitter Bot Challenge.** *IEEE Computer* 49(6), 2016. [1.115]
10. S Agreste, S Catanese, P De Meo, **E Ferrara**, G Fiumara. **Network Structure and Resilience of Mafia Syndicates.** *Information Sciences* 351:30-47, 2016. [3.364]
11. P Singer, **E Ferrara**, F Kooti, M Strohmaier, K Lerman. **Evidence of Performance Deterioration in Online Peer Production.** *Plos One* 11(8): e0161636, 2016. [3.057]
12. CA Davis, GL Ciampaglia, LM Aiello, K Chung, MD Conover, **E Ferrara**, et al. **OSoMe: The IUNI Observatory on Social Media.** *PeerJ Computer Science* 2:e87, 2016.
13. JP Allem, **E Ferrara**. **The importance of de-biasing social media data to better understand e-cigarette-related attitudes and behaviors.** *Journal of Medical Internet Research* 18(8), 2016. [4.532]
- ◇ 14. Q Ke, **E Ferrara**, F Radicchi, A Flammini. **Defining and identifying sleeping beauties in science.** *Proceedings of the National Academy of Sciences* 112(24):7426-7431, 2015. [9.423]
15. J Kaur, **E Ferrara**, F Menczer, A Flammini, F Radicchi. **Quality versus quantity in scientific impact.** *Journal of Informetrics* 9:800-808, 2015. [2.373]

16. S Agreste, P De Meo, **E Ferrara**, S Piccolo, A Provetti. **Analysis of a heterogeneous social network of humans and cultural objects.** *IEEE Trans. Sys., Man and Cybernetics: Systems* 45(4):559-570, 2015. [1.598]
17. B Bonasera, **E Ferrara**, G Fiumara, F Pagano, A Provetti. **Adaptive search over sorted sets.** *Journal of Discrete Algorithms* 30:128-133, 2015.
18. S Agreste, P De Meo, **E Ferrara**, S Piccolo, A Provetti. **Trust Networks: Topology, Dynamics and Measurements.** *IEEE Internet Computing, PP:99*, 2015. [1.400]
19. **E Ferrara**, Z Yang. **Measuring Emotional Contagion in Social Media.** *PLoS ONE* 10(11):e0142390, 2015. [3.057]
20. **E Ferrara**, Z Yang. **Quantifying the Effect of Sentiment on Information Diffusion in Social Media.** *PeerJ Computer Science*, 1:e26 2015.
- ◇ 21. P De Meo, **E Ferrara**, G Fiumara, A Provetti. **On Facebook, most ties are weak.** *Communications of the ACM* 57(11):78-84, 2014. [3.301]
- ◇ 22. A Nematzadeh, **E Ferrara**, A Flammini, YY Ahn. **Optimal Network Modularity for Information Diffusion.** *Physical Review Letters* 113:088701, 2014. (Editors' Suggestion) [7.645]
- ◇ 23. **E Ferrara**, P De Meo, S Catanese, G Fiumara. **Detecting criminal organizations in mobile phone networks.** *Expert Systems with Applications* 41(13):5733-5750, 2014. [2.981]
24. M JafariAsbagh, **E Ferrara**, O Varol, F Menczer, A Flammini. **Clustering memes in social media streams.** *Social Network Analysis and Mining* 4(237):1-13, 2014.
25. P De Meo, **E Ferrara**, D Rosaci, G Sarné. **Trust and Compactness in Social Network Groups.** *IEEE Transactions on Cybernetics PP:99*, 2014. [4.066]
26. S Agreste, P De Meo, **E Ferrara**, D Ursino. **XML Matchers: approaches and challenges.** *Knowledge-based systems* 66:190-209, 2014. [3.325]
- ◇ 27. P De Meo, **E Ferrara**, G Fiumara, A Provetti. **Mixing local and global information for community detection in large networks.** *Journal of Computer and System Sciences* 80(1):72-87, 2014. [1.538]
- ◇ 28. **E Ferrara**, P De Meo, G Fiumara, R Baumgartner. **Web data extraction, applications and techniques: a survey.** *Knowledge-based systems* 70:301-323, 2014. [3.325]
- ◇ 29. MD Conover, **E Ferrara**, F Menczer, A Flammini. **The Digital Evolution of Occupy Wall Street.** *PLoS ONE* 8(5):e64679, 2013. [3.057]
- ◇ 30. **E Ferrara**, AE Romero. **Scientific impact evaluation and the effect of self-citations: Mitigating the bias by discounting the h-index.** *Journal of the American Society for Information Science and Technology* 64(11):2332-2339, 2013. [2.452]
- ◇ 31. P De Meo, **E Ferrara**, F Abel, L Aroyo, GJ Houben. **Analyzing user behavior across social sharing environments.** *ACM Transactions on Intelligent Systems and Technology* 5(1), art. 14:1-31, 2013. [2.414]
- ◇ 32. MD Conover, CA Davis, **E Ferrara**, K McKelvey, F Menczer, A Flammini. **The Geospatial Characteristics of a Social Movement Communication Network.** *PLoS ONE* 8(3):e55957, 2013. [3.057]
- ◇ 33. P De Meo, **E Ferrara**, G Fiumara, A Provetti. **Enhancing community detection using a network weighting strategy.** *Information Sciences* 222:648-668, 2013. [3.364]
- ◇ 34. S Catanese, **E Ferrara**, G Fiumara. **Forensic analysis of phone call networks.** *Social Network Analysis and Mining* 3(1):15-33, 2013.
- ◇ 35. **E Ferrara**. **A large-scale community structure analysis in Facebook.** *EPJ Data Science* 1(9):1-30, 2012. [1.567]
- ◇ 36. P De Meo, **E Ferrara**, G Fiumara, A Ricciardello. **A novel measure of edge centrality in social networks.** *Knowledge-based Systems* 30:136-150, 2012. [3.325]
- ◇ 37. **E Ferrara**. **Community structure discovery in Facebook.** *International Journal of Social Network Mining* 1(1):67-90, 2012.
- ◇ 38. **E Ferrara**, G Fiumara. **Topological features of Online Social Networks.** *Communications on Applied and Industrial Mathematics* 2(2):1-20, 2011.

## Conferences

39. O Varol, **E Ferrara**, CA Davis, F Menczer, A Flammini. **Online Human-Bot Interactions: Detection, Estimation, and Characterization**. *Proceedings of the Eleventh International AAAI Conference on Web and Social Media (ICWSM 2017)*, pp 280-289, 2017.
40. **E Ferrara**, N Alipourfard, K Burghardt, C Gopal, K Lerman. **Dynamics of Content Quality in Collaborative Knowledge Production**. *Proceedings of the Eleventh International AAAI Conference on Web and Social Media (ICWSM 2017)*, pp 520-523, 2017.
41. **E Ferrara**, W-Q Wang, O Varol, A Flammini, A Galstyan. **Predicting online extremism, content adopters, and interaction reciprocity**. *International Conference on Social Informatics 2016*, pp 22-39, 2016.
42. **E Ferrara**. **Social Politics: Agenda Setting and Political Communication in Social Media**. *International Conference on Social Informatics 2016*, pp 330-344, 2016.
43. **E Ferrara**, O Varol, F Menczer, A Flammini. **Detection of Promoted Social Media Campaigns**. *Proceedings of the Tenth International AAAI Conference on Web and Social Media (ICWSM 2016)*, pp 563-566, 2016.
44. Y-S Cho, G Ver Steeg, **E Ferrara**, A Galstyan. **Latent space model for multi-modal social data**. *WWW '16 Proceedings of the 25th International Conference on World Wide Web*, pp 447-458. ACM 2016.
45. CA Davis, O Varol, **E Ferrara**, F Menczer, A Flammini. **BotOrNot: A system to evaluate social bots**. *WWW '16 Companion Proceedings of the 25th International Conference Companion on World Wide Web*, pp 273-274. ACM 2016.
46. J Park, GL Ciampaglia, **E Ferrara**. **Style in the Age of Instagram: Predicting Success within the Fashion Industry using Social Media**. *CSCW '16 Proceedings of the 19th ACM Conference on Computer-Supported Cooperative Work & Social Computing*, pp 64-73. ACM, 2016.
47. L Le, **E Ferrara**, A Flammini. **On predictability of rare events leveraging social media: a machine learning perspective**. *COSN '15: Proceedings of the 2015 ACM on Conference on Online Social Networks*, pp 3-13. ACM, 2015.
- ◇ 48. **E Ferrara**, R Interdonato, A Tagarelli. **Online Popularity and Topical Interests through the Lens of Instagram**. *HT '14 Proceedings of the 25th ACM conference on Hypertext and social media*, pp 24-34. ACM, 2014.
49. X Gao, **E Ferrara**, J Qiu. **Parallel clustering of high-dimensional social media data streams**. *IEEE/ACM CCGrid 2015*, pp 323-332. IEEE, 2015.
- ◇ 50. O Varol, **E Ferrara**, C Ogan, F Menczer, A Flammini. **Evolution of online user behavior during a social upheaval. [Best Paper Award]**. *WebSci '14 Proceedings of the 2014 ACM conference on Web science*, pp 81-90. ACM 2014.
- ◇ 51. **E Ferrara**, O Varol, F Menczer, A Flammini. **Traveling Trends: Social Butterflies or Frequent Fliers?.** *COSN '13 Proceedings of the first ACM conference on Online social networks*, pp 213-222. ACM, 2013.
- ◇ 52. **E Ferrara**, M JafariAsbagh, O Varol, V Qazvinian, F Menczer, A Flammini. **Clustering memes in social media**. *ASONAM '13 Proceedings of the 2013 IEEE/ACM International Conference on Advances in Social Networks Analysis and Mining*, pp 548-555. ACM, 2013.
53. S Catanese, **E Ferrara**, G Fiumara, F Pagano. **A framework for designing 3D virtual environments**. *Lecture Notes: Institute for Computer Sciences, Social Informatics & Telecomm. Engineering 78:209-218*, 2012.
54. G Quattrone, L Capra, P De Meo, **E Ferrara**, D Ursino. **Effective retrieval of resources in folksonomies using a new tag similarity measure**. *CIKM '11 Proceedings of the 20th ACM international conference on Information and knowledge management*, pp 545-550. ACM, 2011.
- ◇ 55. S Catanese, P De Meo, **E Ferrara**, G Fiumara, A Provetti. **Crawling Facebook for social network analysis purposes**. *WIMS '11 Proceedings of the International Conference on Web Intelligence, Mining and Semantics*. Article No. 52. ACM, 2011.
56. S Catanese, **E Ferrara**, G Fiumara, F Pagano. **Rendering of 3D dynamic virtual environments**. *SIMUTools '11 Proceedings of the 4th International ICST Conference on Simulation Tools and Techniques*, pp 351-358. ACM, 2011.
- ◇ 57. P De Meo, **E Ferrara**, G Fiumara, A Provetti. **Generalized Louvain method for community detection in large networks**. *IEEE/ACM/WIC ISDA 2011*, pp 88-93. IEEE, 2011.
58. P De Meo, **E Ferrara**, G Fiumara, A Provetti. **Improving recommendation quality by merging collaborative filtering and social relationships**. *IEEE/ACM/WIC ISDA 2011*, pp 587-592. IEEE, 2011.

59. G Quattrone, **E Ferrara**, P De Meo, L Capra. **Measuring similarity in large-scale folksonomies**. *SEKE 2011: 23rd Inter. Conference on Software Engineering & Knowledge Engineering*, pp 1385-391. 2011.
60. **E Ferrara**, R Baumgartner. **Design of automatically adaptable Web wrappers**. *ICAART 2011: 3rd International Conference on Agents and Artificial Intelligence*, pp 211-216. 2011.
61. **E Ferrara**, R Baumgartner. **Intelligent self-repairable Web wrappers**. *Lecture Notes in Computer Science 6934:274-285 (Artificial Intelligence Around Man and Beyond)*, 2011.
62. **E Ferrara**, G Fiumara, F Pagano. **Living City, a collaborative browser-based massively multiplayer online game**. *SIMUTools '10 Proceedings of the 3rd International ICST Conference on Simulation Tools and Techniques*. Article No. 9. ACM, 2010.

## Workshops

63. A Sapienza, SK Ernala, A Bessi, K Lerman, **E Ferrara**. **DISCOVER: Mining Online Chatter for Emerging Cyber Threats**. *Cyber-Safety 2018: The Third Workshop on Computational Methods in CyberSafety, Online Harassment and Misinformation, WWW 2018*.
64. H Hosseinmardi, H-T Kao, K Lerman, **E Ferrara**. **Discovering Hidden Structure in High Dimensional Human Behavioral Data via Tensor Factorization**. *International Workshop on Heterogeneous Networks Analysis and Mining, WSDM 2018*.
65. A Sapienza, H Peng, **E Ferrara**. **Performance Dynamics and Success in Online Games**. *2017 IEEE International Conference on Data Mining Workshops (ICDMW)*, 902-909 .
66. A Sapienza, A Bessi, K Lerman, S Damodaran, P Shakarian, **E Ferrara**. **Early Warnings of Cyber Threats in Online Discussions**. *2017 IEEE International Conference on Data Mining Workshops (ICDMW)*, 667-674 .
67. **E Ferrara**, P De Meo, S Catanese, G Fiumara. **Visualizing criminal networks reconstructed from mobile phone records**. *ACM Hypertext 2014 (Doctoral Consortium / Late-breaking Results / Workshops)*, 2014.
68. P Moriano, **E Ferrara**, A Flammini, F Menczer. **Dissemination of scholarly literature in social media**. *Altmetrics Workshop*, 2014.
69. R Fulper, GL Ciampaglia, **E Ferrara**, YY Ahn, A Flammini, F Menczer, B Lewis, K Rowe. **Misogynistic Language on Twitter and Sexual Violence**. *Computational Approaches to Social Modeling Workshop*, 2014.
70. P De Meo, **E Ferrara**, D Rosaci, G Sarné. **How to improve group homogeneity in online social networks**. *CEUR Workshop Proceedings 1099:73-77 (14th Workshop "From Objects to Agents" WOA'13)*, 2013.
71. S Catanese, P De Meo, **E Ferrara**, G Fiumara. **Analyzing the Facebook friendship graph**. *CEUR Workshop Proceedings 685:14-19 (1st Workshop on "Mining the Future Internet")*, 2010.

## Book chapters

72. **E Ferrara**. **Measuring social spam and the effect of bots on information diffusion in social media**. *Spreading Dynamics in Social Systems, 2018 (in press)*.
73. **E Ferrara**. **Dynamics of attention and public opinion in social media**. *Communication Science in the Digital Age (Springer)*, 2018 (in press).
74. T Wu, B Zhang, CA Davis, **E Ferrara**, A Flammini, F Menczer, J Qiu. **Scalable Query and Analysis for Social Networks: An Integrated High-Level Dataflow System with Pig and Harp**. *Big Data in Complex and Social Networks*, 2016.
75. **E Ferrara**, S Catanese, G Fiumara. **Uncovering criminal behavior with computational tools**. *Social Phenomena: From Data to Models*. Springer, 2015.
76. X Gao, E Roth, K McKelvey, CA Davis, A Younge, **E Ferrara**, F Menczer, J Qiu. **Supporting a Social Media Observatory with Customizable Index Structures: Architecture and Performance**. *Cloud Computing for Data-Intensive Applications*, pp. 401-427. Springer, 2014.
77. **E Ferrara**. **Measurement and Analysis of Online Social Networks Systems**. *Encyclopedia of Social Network Analysis and Mining*, pp. 891-893. Springer, 2014.
- ◇ 78. S Catanese, P De Meo, **E Ferrara**, G Fiumara, A Provetti. **Extraction and analysis of Facebook friendship relations**. *Computational Social Networks: Mining and Visualization*, pp. 291-324. Springer, 2012.
79. P De Meo, **E Ferrara**, G Fiumara. **Finding similar users in Facebook**. *Social Networking and Community Behavior Modeling: Qualitative and Quantitative Measurement*, pp. 304-323. IGI Publish., 2011.

80. **E Ferrara**, R Baumgartner. **Automatic wrapper adaptation by tree edit distance matching**. *Combinations of Intelligent Methods and Applications*, pp. 41-54. Springer, 2011.

### Ph.D. Dissertation

81. **E Ferrara**. **Mining and analysis of online social networks**. University of Messina, December 2011.

### Editorials

82. **E Ferrara**. **Manipulation and abuse in social media**. *ACM SIGWEB Newsletter*, Spring 2015.
83. **E Ferrara**. **Toward computational crime prediction**. *Physics of Life Reviews*, pp. 28-29, 2015. [7.478]
84. GL Ciampaglia, **E Ferrara**, A Flammini. **Collective Behaviors and Networks**. *EPJ Data Science* 3:37, 2014.
85. **E Ferrara**, S Catanese, G Fiumara. **Criminal Network Analysis and Mining: Introduction**. *Social Informatics*, pp. 75-77, 2014.
86. **E Ferrara**. **How Twitter bots played a role in electing Donald Trump**. *The Conversation: theconversation.com/how-twitter-bots-affected-the-us-presidential-campaign-68406*.

### Under review

87. P Goyal, **E Ferrara**. **Graph Embedding Techniques, Applications, and Performance: A Survey**. *Knowledge-based Systems*.
88. A Badawy, **E Ferrara**. **The Rise of Jihadist Propaganda on Social Networks**. *Journal of Computational Social Science*.
89. A Sapienza, Y Zeng, A Bessi, K Lerman, **E Ferrara**. **Individual Performance in Team-based Online Games**. *Royal Society Open Science*.
90. A Sapienza, A Bessi, **E Ferrara**. **Modeling User Behavior in Online Games**. *Information*.
91. SR Kudugunta, **E Ferrara**. **Deep Neural Networks for Bot Detection**. *Information Sciences*.
92. M Stella, **E Ferrara**, M De Domenico. **Bots sustain and inflate striking opposition in online social systems**. *PNAS*.
93. P Goyal, H Hosseinmardi, **E Ferrara**, A Galstyan. **Embedding Networks with Edge Attributes**. *ACM HyperText 2018*.
94. A Sapienza, P Goyal, **E Ferrara**. **Recommending Teammates with Deep Neural Networks**. *ACM HyperText 2018*.
95. S Arakelyan, F Morstatter, **E Ferrara**, A Galstyan. **Mining and Forecasting Career Trajectories of Music Artists**. *ACM HyperText 2018*.
96. I Pozzana, **E Ferrara**. **Measuring bot and human behavioral dynamics**. *ASONAM 2018*.
97. A Badawy, **E Ferrara**, K Lerman. **Analyzing the Digital Traces of Political Manipulation: The 2016 Russian Interference Twitter Campaign**. *ASONAM 2018*.
98. F Quinkert, T Holz, KSM T Hossain, **E Ferrara**, K Lerman. **RAPTOR: Ransomware Attack PredictOR**. *DIMVA 2018*.

## Education, Honors and Awards

### • Education

2009-11 **Ph.D.** in Mathematics: Machine Learning applications (*Doctor Europaeus* honorific) — University of Messina, Italy.  
Dissertation: *Mining and analysis of online social networks*. Dissertation supervisor: Giacomo Fiumara (U Messina).  
Ph.D. advisors:

- Dr. Alessandro Proveti (Birbeck University of London, UK) <https://scholar.google.com/citations?user=pw0BPPQAAAAJ>
- Dr. Alberto Paccanaro (Royal Holloway University of London, UK) <https://scholar.google.com/citations?user=uXTtbXUAAAAJ>
- Dr. Robert Baumgartner (Vienna Technical University. Vienna, Austria)

Dissertation defense: March 26, 2012

2006-08 **M.Sc.** in Computer Science (*summa cum laude*) — University of Messina, Italy.  
Dissertation: *Design and Development of a Massively-Multiplayer Online Game*.

2003-06 **B.Sc.** in Computer Science (*summa cum laude*) — University of Messina, Italy.

Dissertation: *Optimization of the rail crossing of the Strait of Messina using RFID technology.*

- **Awards**

2016 I was selected as recipient of the **2016 DARPA Young Faculty Award** (\$1,000,000 grant)

2016 I was selected as recipient of the **2016 Complex Systems Society (CSS) Junior Scientific Award**

2016 I was named as the **Inaugural Michael Keston Fellow** at the USC Information Sciences Institute

2016 I raised over **\$30,000** as *General Chair* of the conference “Social Informatics 2016” from industry partners such as Facebook, Microsoft, and Leidos.

2015 I was awarded full funding to attend the 3rd *Heidelberg Laureate Forum* (HLF) in Heidelberg, Germany, by the National Science Foundation (NSF) and Oak Ridge Associated Universities (ORAU) [**\$5,000**]

2014 I was awarded seed funding by the Indiana University Office of the Vice Provost for Research’s Proposal Development Services for a project entitled *Social Attention in Social and Techno-Social Systems* (with Eliot Smith)

2014 I was awarded seed funding by the Indiana University Office of the Vice Provost for Research’s Proposal Development Services for a project entitled *Creating a Computational Framework for Crime Characterization*

2014 I raised **\$28,750** as *Sponsor Chair* of the conference “ACM Web Science 2014” from industry partners such as Google, Facebook, and Microsoft.

2009-2011 I was awarded a **46,440€** *Ph.D. fellowship* from the Ministry of Education, Universities and Research (Italy).

- **Recognition**

- I was elected **Senior Fellow** of **UCLA’s** Institute for Pure and Applied Mathematics (**IPAM**)

- I was ranked 28th in the *Top 100 Big Data Experts to follow* list by Maptive (<https://www.maptive.com/the-top-100-big-data-experts/>).

- I received the **IBM Watson Analytics 2015 VIP Influencer in Big Data** award and a complimentary *VIP guest invitation* at the IBM Insight 2015 conference held in Las Vegas on Oct. 25-29 2015 [\$10,000].

- **Ph.D. Dissertation**

2011 My Ph.D. Dissertation received the **Doctor Europaeus–European Doctorate** honorific.

2011 My Ph.D. Dissertation awarded at the “*5th EuroSys Doctoral Workshop*” organized by University of Cambridge.

2011 My Ph.D. Dissertation awarded at the “*2011 Future perspectives of applied mathematics in Italy*”, organized by The Italian Society of Applied and Industrial Mathematics (SIMAI).

- **Best paper awards, covers and highlights**

2016 My paper “The Rise of Social Bots” was the **cover** of the July 2016 issue of Communications of the ACM.

2015 I was selected by the Scientific Committee of the **Heidelberg Laureate Forum Foundation** (HLFF) to participate to the 3rd Heidelberg Laureate Forum, taking place August 23-28, 2015 in Heidelberg, Germany

2015 My contribution “The Rise of Social Bots: Bot Detection in Social Media” won the **best poster award** at the 2015 Conference on Complex Systems (CCS 2015).

2014 The paper “Optimal Network Modularity for Information Diffusion”, published in the prestigious *Physical Review Letters*, was chosen as highlighted article (**Editors’ Suggestion**).

2014 The paper “Evolution of online user behavior during a social upheaval” won the **Best Paper Award** at the *ACM Web Science 2014 Conference* and was invited for a special issue on *The Journal of Web Science*.

2013 The paper “Clustering Memes in Social Media” has been selected among the **best papers** at *ASONAM 2013* and invited for a special issue on the journal *Social Network Analysis and Mining*, and eventually accepted.

2011 The paper “Generalized Louvain method for community detection in large networks” has been selected among the **best papers** at *ISDA 2011* conference, invited for a special issue on the *Journal of Computer and System Sciences*, and eventually accepted and published.

**Selected popular press** [Complete list of hundreds of news articles at: <http://goo.gl/FGd8gX>]

*Social media ‘bots’ tried to influence the U.S. election. Germany may be next* (Science); *Russia’s propaganda machine amplifies alt-right* (The Hill); *Spreading fake news becomes standard practice for governments across the world* (The Washington Post); *Pro-Trump Twitter bots were also used to target Macron, research shows* (The Verge); *There’s a Bit*

of *Overlap Between Bots Trying to Manipulate American and French Elections* (New York Magazine); *Research links pro-Trump, anti-Macron Twitter bots* (The Hill); *The Same Twitter Bots That Helped Trump Tried to Sink Macron, Researcher Says* (VICE); *How Twitter Is Being Gamed to Feed Misinformation* (New York Times); *Inside Russia's Social Media War on America* (TIME – cover story); *Sleeping Beauties of Science* (Scientific American); *Twitter Bot – or Not?* (The New York Times); *Huge number of Twitter accounts are not operated by humans* (ABC News); *Up to 48 million Twitter accounts are bots, study says* (CNET); *R u bot or not?* (VICE); *New Machine Learning Framework Uncovers Twitter's Vast Bot Population* (Motherboard); *Study reveals whopping 48M Twitter accounts are actually bots* (CBS News); *Twitter is home to nearly 48 million bots, according to report* (The Daily Dot); *Data Mining Reveals the Rise of ISIS Propaganda on Twitter* (MIT Technology Review); *As a conservative Twitter user sleeps, his account is hard at work* (Washington Post); *You've probably been tricked by fake news and don't know it* (Science News); *How the Bot-y Politic Influenced This Election* (MIT Technology Review); *Facebook, Twitter & Trump* (The New York Review of Books); *How Twitter bots played a role in electing Donald Trump* (WIRED); *Twitter Bots Pollute Public's Understanding of Politics* (Newsweek); *How Twitter bots helped Donald Trump win the US presidential election* (Arstechnica); *On Twitter, No One Knows You Are a Trump Bot* (Fast Company); *The Algorithmic Democracy* (Fast Co. Design); *Election 2016 Belongs to the Twitter Bots* (VICE); *Almost a fifth of election chatter on Twitter comes from bots* (Fusion); *How Twitter bots affected the US presidential campaign* (The Conversation); *Algorithm knows when corporate money is pushing memes online* (New Scientist); *The More You Comment Online, The Dumber Your Comments Become* (Huffington Post); *Pro-Trump Twitter Bots at Center of Nevada Mystery* (Wall Street Journal); *How Ebola infected Twitter* (Nautilus); *Is the internet making a world without truth?* (New Scientist); *Why you need to purge your Twitter feed of angry people* (The Telegraph); *On Twitter, Is the Next POTUS a Bot-US?* (Wall Street Journal); *New data suggest social media brings out the best in us, after all* (Quartz); *Why can't Twitter kill its bots?* (Fusion); *The Science of a Supermodel* (Vogue); *Can You Scientifically Predict a Model's Success?* (New York Magazine); *Machine Learning Algorithm Predicts Which New Faces Will Make It as Fashion Models* (MIT Technology Review); *Slack Is Overrun With Bots.* (WIRED); *This new study suggests sad tweets make you sad* (Fusion); *Sleeping Beauties of Science* (Scientific American); *'Sleeping beauty' papers slumber for decades* (Nature News); *Even Einstein's Research Can Take Time to Matter* (New York Times); *Bot or Not? By James Gleick* (The New York Review of Books); *In Social Networking, 'Weak' Connections May Be the Most Powerful* (Vice); *Fear, Misinformation, and Social Media Complicate Ebola Fight* (TIME); *How To Spot A Social Bot On Twitter* (MIT Technology Review); *This Algorithm Tells You If A Twitter Account Is a Spam Bot* (Mashable); *Barack Obama Is Probably a Robot, and Other Lessons from Bot Or Not* (Vice); *How online 'chatbots' are already tricking you* (BBC); *Criminal gang connections mapped via phone metadata* (New Scientist); *How Italy's Secret Police Use Metadata To Track Organized Crime* (Fast Company); *LogAnalysis maps the structure of gangs using phone records* (Engadget); *How to Detect Criminal Gangs Using Mobile Phone Data* (MIT Technology Review); *The Top Five Trend-Setting Cities on Twitter* (MIT Technology Review); *The Anatomy of the Occupy Wall Street Movement on Twitter* (MIT Technology Review); *Cell phone data analysis dials in crime networks* (Science News); *Facebook Builds Better Communities Than Twitter* (The Atlantic); *Facebook Builds Stronger Bonds Than Twitter, Study Says* (Mashable).

## Activities, Outreach and Service

### Organization of conferences and workshops

- Conferences
  1. **Chair** of the *2018 Computational Social Science Summer School*.  
To be held in Marina del Rey, CA (USA) in July 2018
  2. **General Chair** of *SocInfo'16: 8th International Social Informatics Conference*.  
Seattle, WA (USA), November 2016.
  3. **Sponsor Chair** and **Local co-Chair** of *ACM Web Science Conference (WebSci'14)*.  
Bloomington, IN (USA), June 2014.
  4. **Publicity Chair** of *SocInfo'14: 6th International Social Informatics Conference*.  
Barcelona, Spain, November 2014.
- Workshops:
  5. **Co-Chair** of “*ACUMEN: Data Science for Human Performance in Social Networks*” (ICDM 2017 workshop).
  6. **Co-chair** of “*Computational Social Science: Social Contagion, Collective Behaviour, and Networks*” (CCS 2017 workshop). Cancun, Mexico, September 2017.
  7. **Co-chair** of “*Computational Social Science: Social Contagion, Collective Behaviour, and Networks*” (CCS 2016 workshop). Amsterdam, The Netherlands, September 2016.



8. **Co-chair** of “*Computational Social Science: Social Contagion, Collective Behaviour, and Networks*” (ECCS 2015 workshop). Tampa, Arizona, September 2015.
9. **Co-chair** of “*Connecting Online and Offline Life*” (COOL 2014: WWW 2014 workshop). Seoul, Korea, April 8, 2014.
10. **Co-chair** of “*Computational Approaches to Social Modeling*” (ChASM 2014: WebSci 2014 workshop). Bloomington, IN (USA), June 23, 2014.
11. **Co-chair** of “*Computational Social Science: Social Contagion, Collective Behaviour, and Networks*” (ECCS 2014 workshop). Lucca, Italy, September 2014.
12. **Co-chair** of “*Criminal network analysis and mining*” (CRIMENET 2014: a SocInfo 2014 workshop). Barcelona, Spain, November 2014.
13. **Co-chair** of “*Collective Behaviors and Networks 2013*” (Covenant 2013: ECCS 2013 workshop). Barcelona, Spain, September 16-20, 2013.

### Recent talks (2015-2017)

- “*Human performance dynamics in online games*”
  1. ICDM DAPS 2017 [keynote talk], New Orleans, LO, USA. Nov. 2017
  2. DARPA NGS2 Meeting, Washington, DC, USA. Oct. 2016
- “*Humans, bots, and manipulation of social media*”.
  3. MIS2: Misinformation and Misbehavior on the Web [keynote talk]. WSDM 2018. Los Angeles, Feb. 2018
  4. Media Exposure and Opinion Formation workshop [invited talk]. USC. Los Angeles, CA, USA. Nov 2017
  5. UCLA. Los Angeles, CA, USA. March 2017
  6. University College London (UCL), London, UK. Feb. 2017
  7. USC: Rusch Undergraduate Engineering Honors Colloquia. Los Angeles, CA, USA. Jan. 2017
  8. Stanford University: 2016 Digital Campaign [invited talk]. Stanford, CA, USA. Dec. 2016
  9. Chasm 2016: Computational Approaches to Social Modeling [keynote talk]. Seattle, WA, USA. Nov. 2016
- “*Social Politics: Agenda Setting and Political Communication in Social Media*”.
  10. Social Informatics 2016, Seattle, WA, USA. Nov. 2016
- “*Predicting human behaviors in techno-social systems: fighting abuse and illicit activities*”.
  11. Kobe University [invited talk]. Kobe, Japan. Sept. 2016
  12. USC AI for Social Good center [invited talk]. Los Angeles, CA (US). Sept. 2016
  13. HRL Laboratories [invited talk]. Malibu, CA (US). July 2016
  14. Northwestern University [invited talk]. Evanston, IL (US). Feb. 2016
  15. University of California, Los Angeles [invited talk]. Los Angeles, Jan. 2016
  16. University of Southern California, IPAM [invited talk]. Los Angeles, CA (US). Jan. 2016
  17. USC’s Information Sciences Institute. Marina del Rey, CA (US). Apr. 2015 (<http://goo.gl/oJaVLo>)
  18. Syracuse University [invited talk]. Syracuse, NY (US). Apr. 2015
  19. Northeastern University [invited talk]. Boston, MT (US). Mar. 2015
  20. New Jersey Institute of Technology [invited talk]. Newark, NJ (US). Mar. 2015
  21. DARPA ADAMS/SMISC Meeting. Arlington, VA (US), Mar. 2015
- “*On predictability of rare events leveraging social media: a machine learning perspective*”
  22. ACM COSN’15: ACM Conference on Online Social Networks. Stanford University, Stanford (US). Nov. 2015
  23. CCS’15: Conference on Complex Systems [invited talk]. Tempe, AZ (US). Sept. 2015
- “*Measuring emotional contagion in online social media*”
  24. CCS’15: Conference on Complex Systems [invited talk]. Tempe, AZ (US). Sept. 2015

- “*The rise of social bots: fighting deception and misinformation on social media*”.
- 25. CCS’15: Conference on Complex Systems [invited talk]. Tempe, AZ (US). Sept. 2015
- 26. Indiana University [invited talk]: Network Science talks. Bloomington, IN (US). Jan. 2015

## Editorial Boards

- Editorial Board member of *Future Internet* (MDPI - <http://www.mdpi.com/journal/futureinternet/editors>)
- Editorial Board member of *Data Science* (IOS Press - <https://www.iospress.nl/journal/data-science/>)
- Editor of the “Computational Social Sciences” special issue on *Future Internet* (<http://goo.gl/04o9La>)
- Editor of *EPJ Data Science*’s thematic series “Collective Behaviors and Networks” (<http://goo.gl/jfVbZt>)

## Referee

- **Journals** — ACM Transactions on: (i) Information Systems; (ii) Knowledge Discovery from Data; (iii) Internet Technology; (iv) Intelligent Systems and Technology; Artificial Intelligence Journal; Communications of the ACM; Complex Adaptive Systems Modeling; Computer Communications; Data Mining and Knowledge Discovery; EPJ Data Science; Entropy; Expert Systems With Applications; IEEE Transactions on: (i) Information Forensics and Security; (i) Cybernetics; (iii) Systems, Man and Cybernetics: Systems; (iv) Information Forensics & Security. Information Sciences; Journal of the American Society for Information Science and Technology; Journal of Computer-Mediated Communication; Knowledge-based systems; Network Science; Pervasive and Mobile Computing; PLoS ONE; Physica A; Nature Scientific Reports; Social Network Analysis and Mining; The Computer Journal; World Wide Web Journal.
- **Conference Program Committee** — **WWW 2018** (Social Network track & Web/Society track); **HyperText 2018** (Senior PC); **ICWSM 2017** (Senior PC); **WebSci 2017** (Senior PC); **NetSci 2017** (Senior PC); International School and Conference on Network Science; **WWW 2017** (Social Network track & Web Science track); **IC<sup>2</sup>S<sup>2</sup> 2017**; **CCS 2017**: Conference on Complex Systems; **IJCAI 16**: 25th International Joint Conference on Artificial Intelligence; **ACM WebSci 16**: 10th Web Science Conference; **ICWSM 2016** (Senior PC); **WWW 2016** (Social Network track & Web Science track); **IC<sup>2</sup>S<sup>2</sup> 2016**; **ICWSM 2015**; **WWW 2015** (Social Network track & Web Science track); **ASONAM 2015**: Advances in Social Network Analysis and Mining; **IC<sup>2</sup>S<sup>2</sup> 2015**: International Conference on Computational Social Science; **SocInfo 2015**; **SocialCom 2015**; **SocInfo 2014**: 6th International Conference on Social Informatics; **ICWSM 2014**: 8th International AAAI Conference on Weblogs and Social Media; **WWW 2014**: 23rd International World Wide Web Conference (Social Network track & Web Science track); **SocialCom 2014**: 7th International Conference on Social Computing; **SITIS 2014**: 10th International Conference on Signal-Image Technology & Internet-Based Systems; **WEB 2014**: Conference on Building and Exploring Web Based Environments; **CIKM 2011**: Conference on Information and Knowledge Management; **ISDA 2011**: International Conference on Intelligent Systems Design and Applications.
- **Grant panels member** — (2012) National Fund for Scientific and Technological Development: Chilean Government Commission; (2013) Federal Department of Economic Affairs, Education and Research: SERI/COST Action, Swiss Confederation; (2014) Austrian Science Fund: FWF.

## Open-source tools & data

- I lead the design and development of *Botometer* (a.k.a. *Bot or Not*) —the Twitter social bot detection framework openly accessible at: <http://botometer.org>
- I developed and released *Conclude: a large scale network community detection framework*, and the *KPath: Random walk network weighting fast algorithm* (codes available at: <http://goo.gl/d39ouY>).
- I keep a repository of online platform datasets I collected for research purpose (including Facebook and Instagram), that I openly share with the community (data available at: <http://goo.gl/nhLJwJ>).

## Teaching

- 2017-18 **USC INF-599: Special Topics: Mining the Social Web** — Primary Instructor (Syllabus: <http://goo.gl/LfKIWR>)
- 2015-16 **USC CSCI-599: Special Topics: Social Networks** — Guest Lecturer  
 INF-549: **Introduction to Computational Thinking and Data Science** — Guest Lecturer
- 2014-15 **IU INFO-I400/590: Mining the Social Web** — Primary Instructor  
 Course evaluation: 4.9/5 Outstanding Instructor - 4.1/5 Outstanding Course  
 INFO-I400/590: **Today’s Privacy Challenges** — Guest Lecturer  
 INFO-I400/590: **Large-scale Social Phenomena** — Guest Lecturer
- 2013-14 **IU INFO-I601: Introduction to Complex Systems** — Guest Lecturer  
 INFO-I690: **Mathematical Methods for Complex Systems** — 15 Guest Lectures

2010-11 **Advanced Programming Languages, Algorithms and Data Structures, Programming Languages, Computer Architectures, Operating Systems** (University of Messina, Italy) — Lab Instructor (4 semesters)

### Mentoring

2017-18 **University of Southern California:**

**Postdocs:** Homa Hosseinmardi, Goran Muric, Anna Sapienza

**PhD students:** Adam Badawy (Political Sciences), Ashok Deb (CS), Palash Goyal (CS), Hsien-Te Kao (CS), Akira Matsui (CS), Shen Yan (CS), Yilei Zeng (CS)

**MSc:** Di Huang

**Undergrads:** Qufei Wang, Yiyun Zhu

summer '17 **USC/ISI summer interns:** Amir Yazdavar (PhD student from Write State University); Sindhu Ernala (PhD student from Georgia Tech University); Sneha Kudugunta (undergrad from IIT Hyderabad); Hao Peng (PhD student from Indiana University); Iacopo Pozzana (PhD student from Birbeck University of London).

2016-17 **University of Southern California:** *Laura Alessandretti* (USC/ISI summer fellow PhD student), *Adam Badawy* (USC Dornsife PhD student), *Alessandro Bessi* (Postdoc), *Prathmesh Gat* (USC Viterbi MSc student), *Chiranth Gopal* (*Viterbi-India program* undergrad student), *Palash Goyal* (USC Viterbi CS PhD Student), *Margaret Martin* (USC Viterbi CS MSc student), *Simrat Singh* (USC Viterbi CS MSc student), *Anna Sapienza* (Postdoc), *Archit Srivastava* (USC Viterbi CS MSc student), *Sree Uppu* (USC Viterbi CS MSc student)

2015-16 **Information Sciences Institute at USC:** mentored three graduate students.

spring '15 **Achievements of Women in STIM:** mentor and panel judge.

spring '15 **CNetS Lab at Indiana University:** I am mentored five graduate students.

2012-14 **CNetS Lab at Indiana University:** I mentored three graduate students in 2012, seven in 2013, and eight in 2014, for a total of *fifteen different graduate students* mentored at IU during my postdoctoral activity.

summer '13 **Women SROC (Summer Research Opportunities in Computing) at Indiana University:** I supervised two STEM Informatics BSc summer students at Indiana University.

2010-12 I supervised four BSc. and one MSc. candidates in Computer Science at the University of Messina, Italy.