

Giovanni Neglia

Research Interests

Performance evaluation of distributed systems, in particular cache networks and large-scale learning systems. My research is characterized by the application of different mathematical tools (Markov processes, control theory, continuous optimization, fluid models, game theory).

Education

2017	Habilitation à diriger des recherches (HDR), Univ. of Nice Sophia Antipolis. Thesis: <i>Delay Tolerant Networks: from modeling to optimization.</i>
2005	Ph.D. in Computer Science, Univ. of Palermo, Italy. Thesis: <i>Ingress Traffic Control in Differentiated Services IP Networks.</i> Advisor: Prof. Giuseppe Bianchi.
2001	Master in Electronic Engineering, major Telecommunication, Univ. of Palermo, Italy, Summa (110/110) cum laude.
2001	Master “Vivai d’impresa,” Centro Elis, Rome, Italy to promote new high-tech startups.

Research Experience

Since 2008	Permanent researcher, Inria – Sophia Antipolis.
2006–2008	External Scientific Advisor, Inria – Sophia Antipolis.
2005–2008	PostDoc, Dept. of Electrical Engineering, Univ. of Palermo.
2005	Research scholar, Computer Science Department, Univ. of Massachusetts Amherst, working with prof. Jim Kurose and prof. Don Towsley.
2002–2003	Research consultant at CRES (Center for Electronic Research in Sicily).

Awards

- IEEE Infocom Distinguished TPC member (2017 and 2018).
- Best paper award at the 7th Brazilian Workshop on Social Network Analysis and Mining (BraSNAM 2018) for *Visibilidade no Facebook: Modelos, Medições e Implicações.*
- Best paper award at ITC28 2016 for *Access-time aware cache algorithms.*
- Best paper award at IEEE Online Greencomm 2014 for *On the Complexity of Optimal Electric Vehicles Recharge Scheduling.*
- Best paper award at IEEE Infocom workshop on Network Science for Communication Networks (NetSci-Com) 2014 for *Pay Few, Influence Most: Online Myopic Network Covering.*
- Best Paper Award at the 77th IEEE Vehicular Technology Conference (VTC 2013), for *On Optimal Packet Routing in Deterministic DTNs.*
- Best Student Paper Award at the 6th Intl. Conference on Performance Evaluation Methodologies and Tools (ValueTools 2012), for *Analysis of TTL-based Cache Networks.*
- Best Paper Award at the 2nd Intl. Conference on Bio-Inspired Models of Network, Information, and Computing Systems (Bionetics 2007), for *Evaluating Activator-Inhibitor Mechanisms for Sensors Coordination.*
- Inria Research and Doctoral Supervision Bonus (2011–2014, 2015–2018, 2019–2022).

Professional Service

Conference Organization

InThingS	Member of the Steering Committee of the Workshop on Intelligent Things and Services (InThingS) since Nov. 2020.
InThingS '20	Organized with L. Galluccio (Univ. of Catania, Italy), V. Poor (Princeton Univ., USA), and T. Quek (SUTD, Singapore) the 1 st Intl. Workshop on Intelligent Things and Services (InThingS '20).
ICNC '18	Chair with W. Li (New York Institute of Technology, USA) and B. Cao (Chongqing Univ. of Post and Telecommunications, China) of the “Communication QoS and System Modeling” Symposium of the IEEE Intl. Conf. on Computing, Networking and Communications (ICNC-CQSM '18).
ICCCN '10	Chair with S. Shakkottai (Texas A&M Univ., USA) of the “Network Algorithms, Performance Evaluation and Theory” track of the 19 th Intl. Conf. on Computer Communications and Networks (ICCCN-NAPET '10).
SING '10	Organizing committee of the 6 th “Spain, Italy, and Netherlands meeting on Game theory.”
Interperf '08	Chair with V. Pappas (IBM's T J Watson Research Lab, USA) of the 3 rd Workshop on Interdisciplinary Systems Approach in Performance Evaluation and Design of Computer and Communication Systems.
Publicity chair	for ACM e-Energy '21 , ACM MobiHoc '19 , IEEE INFOCOM '14 .

Technical Program Committees

2009–2021: INFOCOM. 2021: RSEML (AAAI workshop), MedComNet, WEEE; 2019: CAOS, CCDWN; 2018: IEEE JSAC Special issue on Caching for Communication Systems and Networks, RAWNET, WAIN; 2017: RAWNET; 2015: Valuetools, NetSciCom, CHANTS; 2014: NetSciCom, Valuetools, MED control conference, CHANTS. 2013: Algotel, CHANTS, ITC, ValueTools, VTC; 2012: ICCCN, MobiOpp, ValueTools; 2011: ICC, ICCCN, AOC, BWCCA; 2010: INFOCOM Work in Progress track, MobiHoc, ISWPC, ICCCN, WirelessDays; 2008: Autonomics, NET-COOP.

Editorial Board

Associated editor for [IEEE Transactions on Mobile Computing](#) since 2019.

Area editor for [Elsevier Computer Communication journal](#) (COMCOM) since 2014.

Guest editor for IEEE Transactions on Network Science and Engineering special issue on [Communication-Efficient Distributed Machine Learning](#).

Evaluation Committees

PhD defenses (7 in France, 4 abroad) C. Tapparello (2012, Univ. of Padua, Italy, reviewer), P. Ginzboorg (2014, Aalto univ., Finland, reviewer), N. Choungmo Fofack (2014, Univ. Nice Sophia Antipolis, jury member), F. Mehmeti (2015, Eurecom, jury member), L. Vigneri (2017, Eurecom, jury member), R. Varloot (2018, Ecole Normale Supérieure, president of the jury), T. Debatty (2018, Telecom ParisTech, reviewer and jury member), M. Jawad Khokhar (2019, UCA, jury member), D. Bega (2020, IMDEA, Spain, jury member), N. Piovesan (2020, CTTC, Spain, jury member), G. Mita (2021, Sorbonne Univ., reviewer).

Univ. recruitment Assistant professor position at Univ. of Avignon, France, 2014.

Univ. evaluation Reviewer for the Italian National Agency for University Evaluation (ANVUR) to evaluate the quality of universities' scientific production, 2011–2014.

At Inria and Univ. Côte d'Azur.

Since 2021	Committee member for UCA Academy of Excellence “Networks, Information, and Digital Society.”
2014–2020	Inria Scientific delegate for European partnerships.
Since 2016	Member of Inria COST GTRI (groupe de travail des relations internationales du Comité d'Orientation Scientifique et Technique).

Students and Postdocs

For co-supervisions I estimate my contribution.

- 6 postdocs : A. Utku ('09-'10), M. Panda ('11), V. Singh ('14, 40%), C. Xu ('18-'21), S. Bera ('20, 50%), G. Castellano ('21-'22).
- 9 PhD students at Univ. of Nice: M. El Chamie ('11-'14, 50%), A. Benegiamo ('13-'15, 50%), H. Mykhailenko ('14-'17, 50%), G. Ricardo ('18-ongoing, 50%), T. Si Salem ('19-ongoing, 80%), O. Chuchuk ('20-ongoing, 100%), Y. Ben Mazziane ('20-ongoing, 50%), O. Marfoq ('20-ongoing, 80%), A. Rodio ('21-ongoing, 50%).
- 7 visiting PhD students: S. Tarapiah (Politechnic Univ. of Turin, '09-'10), R. Masiero (Univ. of Padua, '10), N. Accettura (Politechnic Univ. of Bari, '12), C. Rottondi (Politechnic Univ. of Milan, '14), G. Di Bella (Univ. of Palermo, '14), G. Vardoyan (UMass Amherst, '18), A. Sabnis (UMass Amherst, '19).
- 37 Master interns ([complete list online](#)): 15 at Inria from French universities (mostly UCA), 10 at Inria from foreign universities, 12 at Univ. of Palermo.

Teaching

Most of my teaching activity has been at Université Nice Sophia-Antipolis, now Université Côte d'Azur (UCA), or at University of Palermo, Italy (UniPa).

Organization Duties

<i>Master final projects</i>	Responsible for Intl. Master Ubinet, UCA, 2009–2015.
<i>Winter school on Complex Networks</i>	I was in charge (content definition, teachers' selection, schedule) and myself a teacher for this winter school on complex networks for the Intl. Master in Computer Science and the PhD school EDSTIC at UCA. About 28 hours were given every year by 8 different specialists in the field to about 25 students from 2014 until 2018 (5 times).
<i>Game Theory: Applications to Computer Networks</i>	Videoconference course among UniPa (Italy), UMass Amherst (USA), UFRJ (Brazil), EPFL (Switzerland). I was in charge of the course for UniPa and one of the lecturers, March - May 2006. 40 hours.

Selected University Courses ([complete list online](#))

PhD level (46 hours)

<i>Distributed Machine Learning</i>	Lecture at the PhD Summer School of Information Engineering (SSIE), 2021, Bresanone, Italy, 2 hours. Invited .
<i>Online Learning with applications to Caching</i>	Lecture at the PhD school "E2E validation of 5G networks" organized by the H2020 Innovative Training Network SEMANTIC, 2021, 3.5 hours. Invited .
<i>Complex Networks</i>	PhD winter school, 2015, Univ. of Pisa, Italy, 20 hours. Invited .
<i>Perron-Frobenius Theory</i>	PhD course, 2012, Ecole Doctorale STIC, UCA, 13.5 hours.
<i>Complex Networks</i>	Lecture, UniPa, 2011, Italy, 3 hours. Invited .
<i>Introduction to Game Theory</i>	Lecture at the PhD school organized by the Italian Control Theory society, 2011, Bertinoro, Italy, 4 hours. Invited .

Master level (280 hours)

<i>Optimization for Machine Learning</i>	Master Data Science and AI, UCA, 30 hours, 2021. I defined the contents.
<i>Distributed Optimization and Games</i>	Intl. Master Ubinet and Master Data Science and AI, UCA, 21 hours, from 2014 until 2020 (6 times). I defined the contents.
<i>Winter school on Machine learning</i>	Intl. Master in Computer Science, UCA, 24 hours, 2019. I defined the contents.
<i>Other courses:</i>	Performance Evaluation of Networks , Intl. Master Ubinet, UCA, 21 hours, from 2009 until 2013 (5 times); NS-2 advanced simulation , Master STIC, UCA, 15 hours, with M. Ibrahim, 2008; Introduction to Fluid Models , Master of Telecommunication engineering, UniPa, 6 hours, 2011; Digital Signal Processing Labs , Master of Telecommunication engineering, UniPa, 25 hours, 2004.

Undergraduate level (310 hours)

Courses: Probability and Statistics, UCA, about 40 hours, in 2009 and 2010 (both times with S. Alouf) for the Bachelor in applied mathematics and modeling, and in 2011 (with C. Barakat), in 2013–2015 (with S. Alouf), in 2016, in 2017 (with S. Alouf) and in 2018 for the Bachelor in water engineering (9 times); IP Networks, Bachelor in Computer Science, UniPa, 50 hours, in 2005 and in 2007 (2 times); Digital Signal Processing Labs, Bachelor in Computer Science, UniPa, 12 hours, 2004.

Selected Keynotes and Invited Talks

- “Machine Learning Training: Research Challenges and Opportunities for the Networking Community” keynote at the [Italian Networking Workshop](#), 29 January 2020, Cavalese, Italy.
- “Machine Learning Training: Research Challenges and Opportunities for Distributed Computing” at the International Workshop on Distributed Cloud Computing ([DCC](#)), 18 October 2019, Budapest, Hungary.
- “Implicit Coordination of Caches in Small Cell Networks under Unknown Popularity Profiles” at the workshop Technologies for the Wireless Edge ([EdgeTech](#)) of the 24th Annual Intl. Conf. on Mobile Computing and Networking (ACM MobiCom 2018), 2 November 2018, New Delhi, India. 2018
- “Transient and Slim versus Recurrent and Fat: Random Walks and the Trees they Grow” at the UCA workshop on Social Interactions and Complex Dynamics, 30 November 2018, Nice, France.
- “Implicit Coordination of Caches in Small Cell Networks under Unknown Popularity Profiles” at the GdR ISIS workshop [PHY-Aware Edge Caching in 5G](#), 9 December 2017, Paris, France.
- “Access-time aware cache algorithms” at UCN’16 Workshop on Future challenges in User-Centric Networks, 14 June 2016, Antibes Juan-les-Pins, France.
- “How to network in online social networks” at [IFCAM Workshop](#), 16 January 2014, IISc Bangalore, India.
- “Dynamics and Convergence in Distributed Systems” at the Workshop on Algorithmic GameTheory (AlgoGT), 20 June 2011, Grenoble, France.
- “From Computer Networks to Network Science: a Research Path” at the 5th French-Japanese Symposium Frontiers of Science, 22 January 2011, Tokyo, Japan.
- “Epidemic Routing in Intermittently Connected Networks,” Telecommunications Colloquium Series, 21 January 2008, Delft, Netherlands.

Bilateral Industrial Collaborations

<i>Nokia Bell Labs</i> (Jan. 2020 - Dec. 2022)	Joint project “Rethinking the network” to design network support to distributed AI training. The grant (124k€) funds two postdocs (36 months) and missions.
<i>Accenture Labs</i> (Dec. 2019 - Dec. 2023)	Joint project “Distributed Machine Learning for IoT applications.” The corresponding grant (227k€) funds the pre-PhD contract and the PhD salary of Othmane Marfoq (48 months).
<i>Payback Network</i> (Nov. 2019 - Febr. 2021)	2-day consulting (2k€) with M. Lorenzi on differential privacy for Payback Network, a startup in Sophia Antipolis that sells customers’ expenditure profiles to large retailers. We interact with the technological accelerator Flexeper.
<i>Lucie Labs</i> (May 2016 - Jan. 2017)	Lucie Labs is a startup in Sophia Antipolis that produces connected wristbands for large-scale events (e.g., concerts). I studied which hybrid localization algorithms are suited for a large number ($> 10^4$) of Lucie Labs wristbands. Funding: 16k€.
<i>Alstom transport</i> (Dec. 2013 - May 2016)	Research grant (150k€) to model communications-based train control and develop modules for ns-3 simulator.
<i>Akamai Technologies</i> (Sept. 2014 - Dec. 2016)	Joint research project to solve the problem of spurious misses in Akamai content delivery networks (CDNs). Akamai is the world leader for CDN services.
<i>Alcatel-Lucent Bell Labs</i> (Jan. 2013 - Jan. 2016)	Joint project “Network Science.” The grant (156k€) funded the salary of a PhD student and missions.
<i>Orange Labs</i> (Oct. 2010 - Dec. 2012)	Research grant (125k€) to develop mathematical models for the analysis of Content-Centric Networks.

Selected Publications since 2017

I have co-authored more than 110 publications, downloadable from [my website](#). They have collected more than 2900 citations and my h-index is 24 (source: [Google scholar](#), 5 April 2021).

Journals

- [J1] G. Ricardo, A. Tuholukova, G. Neglia, and S. Thrasyvoulos. “Caching Policies for Delay Minimization in Small Cell Networks with Coordinated Multi-Point Joint Transmissions”. In: *IEEE/ACM Trans. on Networking* (2021).
- [J2] C. Xu, G. Neglia, and N. Sebastianelli. “Dynamic Backup Workers for Parallel Machine Learning”. In: *Elsevier Computer Networks* 188 (2021).
- [J3] D. Carra, G. Neglia, and P. Michiardi. “Elastic Provisioning of Cloud Caches: A Cost-Aware TTL Approach”. In: *IEEE/ACM Trans. on Networking* 28.3 (2020).
- [J4] V. Fedchenko, G. Neglia, and B. Ribeiro. “Feedforward Neural Networks for Caching : Enough or Too Much?”. In: *ACM SIGMETRICS Performance Evaluation Review* 46.3 (Jan. 2019).
- [J5] E. Hargreaves, C. Agosti, D. S. Menasché, G. Neglia, A. Reiffers-Masson, and E. Altman. “Fairness in Online Social Network Timelines: Measurements, Models and Mechanism Design”. In: *Performance Evaluation* 129 (Feb. 2019).
- [J6] G. Iacobelli, D. Figueiredo, and G. Neglia. “Transient and slim versus recurrent and fat: Random walks and the trees they grow”. In: *Journal of Applied Probability* 56.03 (Sept. 2019).
- [J7] A. Benegiamo, P. Loiseau, and G. Neglia. “Dissecting demand response mechanisms: The role of consumption forecasts and personalized offers”. In: *Sustainable Energy, Grids and Networks* 16 (2018).
- [J8] E. Leonardi and G. Neglia. “Implicit Coordination of Caches in Small Cell Networks Under Unknown Popularity Profiles”. In: *IEEE Journal on Selected Areas in Communications* 36.6 (June 2018).
- [J9] G. Neglia, D. Carra, and P. Michiardi. “Cache Policies for Linear Utility Maximization”. In: *IEEE/ACM Trans. on Networking* 26.1 (2018).
- [J10] G. Neglia, L. Giarré, I. Tinnirello, and G. D. Bella. “Teletraffic engineering for direct load control in smart grids”. In: *Sustainable Energy, Grids and Networks* 16 (2018).
- [J11] I. Tinnirello, G. Neglia, L. Giarré, G. Di Bella, A. Jean-Marie, and M. G. Ippolito. “Large Scale Control of Deferrable Domestic Loads in Smart Grids”. In: *IEEE Trans. on Smart Grid* 9.2 (Mar. 2018).
- [J12] E. Altman, F. De Pellegrini, D. Miorandi, and G. Neglia. “Adaptive Optimal Stochastic Control of Delay-Tolerant Networks”. In: *IEEE Trans. on Mobile Computing* 16.7 (July 2017).
- [J13] G. Neglia, D. Carra, M. Feng, V. Janardhan, P. Michiardi, and D. Tsigkari. “Access-time aware cache algorithms”. In: *ACM Trans. on Modeling and Performance Evaluation of Computing Systems (TOMPECS)* 2.4 (Dec. 2017).

Conferences

- [C1] A. Sabnis, T. Si Salem, G. Neglia, M. Garetto, E. Leonardi, and R. Sitaraman. “GRADES: Gradient Descent for Similarity Caching”. In: *IEEE Intl. Conference on Computer Communications (INFOCOM)*. May 2021.
- [C2] T. Si Salem, G. Neglia, and S. Ioannidis. “No-Regret Caching via Online Mirror Descent”. In: *IEEE Intl. Conference on Communications (ICC)*. June 2021.
- [C3] D. Carra and G. Neglia. “Efficient Miss Ratio Curve Computation for Heterogeneous Content Popularity”. In: *2020 USENIX Annual Technical Conference (USENIX ATC 20)*. USENIX Association, July 2020.
- [C4] M. Garetto, E. Leonardi, and G. Neglia. “Similarity Caching: Theory and Algorithms”. In: *IEEE Intl. Conference on Computer Communications (INFOCOM)*. Toronto, Canada, July 2020.
- [C5] O. Marfoq, C. Xu, G. Neglia, and R. Vidal. “Throughput-Optimal Topology Design for Cross-Silo Federated Learning”. In: *34th Conference on Neural Information Processing Systems (NeurIPS 2020)*. Dec. 2020.
- [C6] G. Neglia, C. Xu, D. Towsley, and G. Calbi. “Decentralized gradient methods: does topology matter?”. In: *23rd Intl. Conference on Artificial Intelligence and Statistics (AISTATS)*. Aug. 2020.
- [C7] N. K. Panigrahy, P. Nain, G. Neglia, and D. Towsley. “A New Upper Bound on Cache Hit Probability for Non-anticipative Caching Policies”. In: *38th Intl. Symposium on Computer Performance, Modeling, Measurements and Evaluation (Performance 2020)*. Milan / Virtual, Italy, Nov. 2020.
- [C9] C. Xu, G. Neglia, and N. Sebastianelli. “Dynamic Backup Workers for Parallel Machine Learning”. In: *2020 IFIP Networking Conference (Networking)*. 2020.
- [C10] D. Carra, G. Neglia, and P. Michiardi. “TTL-based Cloud Caches”. In: *IEEE Intl. Conference on Computer Communications (INFOCOM)*. Paris, France, Apr. 2019.
- [C12] G. Neglia, G. Calbi, D. Towsley, and G. Vardoyan. “The Role of Network Topology for Distributed Machine Learning”. In: *IEEE Intl. Conference on Computer Communications (INFOCOM)*. Paris, France, Apr. 2019.
- [C13] E. Hargreaves, C. Agosti, D. Menasché, G. Neglia, A. Reiffers-Masson, and E. Altman. “Biases in the Facebook News Feed: A Case Study on the Italian Elections”. In: *2018 IEEE/ACM Intl. Conference on Advances in Social Networks Analysis and Mining (ASONAM)*. Aug. 2018.
- [C15] H. Mykhailenko, G. Neglia, and F. Huet. “Simulated Annealing for Edge Partitioning”. In: *IEEE Intl. Conference on Computer Communications Workshops (INFOCOM WKSHPS)*. Atlanta, United States, May 2017.
- [C16] G. Neglia, D. Carra, and P. Michiardi. “Cache Policies for Linear Utility Maximization”. In: *IEEE Intl. Conference on Computer Communications (INFOCOM)*. Atlanta, United States, May 2017.
- [C17] A. Tuholukova, G. Neglia, and T. Spyropoulos. “Optimal Cache Allocation for Femto Helpers with Joint Transmission Capabilities”. In: *IEEE Intl. Conference on Communications (ICC)*. Paris, France, May 2017.