Carmela Bernardo

Postdoctoral Researcher
Department of Engineering
University of Sannio, Benevento, Italy

EDUCATION

Ph.D. in Systems and Control Engineering
2018–2022

University of Sannio, Benevento, Italy
Research field: *Analysis and modeling of opinion dynamics*
Thesis title: *Convergence analysis of heterogeneous opinion dynamics with bounded confidence and stubbornness*
Supervisor: *Prof. Francesco Vasca*

Visiting Ph.D. student
2020

Linköping University, Linköping, Sweden
Research field: *Application of opinion dynamics models*
Supervisor: *Prof. Claudio Altafini*

Courses in anthropo-psycho-pedagogical disciplines and teaching methodologies
2018

University of Sannio, Benevento, Italy

Master's degree in Computer Engineering
2016–2018

University of Sannio, Benevento, Italy
Thesis title: *Competition and generosity in the analysis of consensus in dynamic social networks*
Supervisor: *Prof. Francesco Vasca*
Grade: *110/110 cum laude*

Bachelor's degree in Computer Engineering
2012–2015

University of Sannio, Benevento, Italy
Thesis title: *Design and development of a system to measure the position of UAVs in a defined space*
Supervisor: *Prof. Pasquale Daponte*
Grade: *110/110 cum laude*

Scientific high school diploma
2007–2012

Higher Education Institution "Alfonso Maria de' Liguori", Sant'Agata de' Goti (BN), Italy
Grade: *100/100*

ACADEMIC EXPERIENCE

Postdoctoral researcher
2024–···

University of Sannio, Benevento, Italy
Research field: *Application of opinion dynamics models and network science*

Postdoctoral researcher
2022–2024

Linköping University, Linköping, Sweden
Research field: *Analysis and application of opinion dynamics models*

TEACHING ACTIVITIES

Course lecturer

- *Learning for dynamics and control* (6 credits), Master's degree in Electronics Engineering for Automation and Sensing, University of Sannio, Benevento, Italy (academic year 2024/25)
- *Numerical analysis with MATLAB* (6 credits), Ph.D. in Information Technologies for Engineering, University of Sannio, Benevento, Italy (academic years 2023/24, 2024/25)

Subject expert

- *Dynamic systems* (9 credits), Bachelor's degree in Computer Engineering and Electronic Engineering, University of Sannio, Benevento, Italy (academic year 2023/24)

Student co-supervisor

- Master thesis of Alessandra Genca, *"A profiling algorithm for multilayer social networks"*, Computer Engineering, University of Sannio, Benevento, Italy, 2020

RESEARCH EXPERIENCE

Editorial board

- Technical committee member of *2026 International Conference on Internet of Things and Smart Urban Ecosystems (IoTSUE)*
- Associate editor of *2025 IEEE International Conference on Systems, Man, and Cybernetics (SMC)*
- Editorial board member of *Control Science and Engineering* (2022–2024)

Participation in projects

- *Higher order interactions in social dynamics with application to monetary networks* (network analysis)   *2024–···*
- *IDA–Information Disorder Awareness* (development of a framework for fake news propagation)   *2024–···*
- *PFP. Progetti Formativi Personalizzati* (impact assessment)   *2019–2024*
- *I Piccoli Comuni del Welcome* (network analysis)   *2019–2023*

Reviewer for international journals

Automatica, Discrete and Continuous Dynamical Systems - Series B, Entropy, Frontiers in Physics, IEEE Control Systems Letters, IEEE Transactions on Automatic Control, IEEE Transactions on Control of Network Systems, IEEE Transactions on Network Science and Engineering, Information Fusion, International Journal of Hydrogen Energy, Journal of Computational Social Science, Journal of Industrial and Management Optimization, Journal of Power Sources, Knowledge and Information Systems, Mathematical Problems in Engineering, Mathematical Reviews, Mathematics, Network Science, Nonlinear Analysis: Hybrid Systems, PLOS Complex Systems, SIAM Journal on Applied Dynamical Systems, SIAM Journal on Control and Optimization

Reviewer for international conferences

American Control Conference (ACC), European Control Conference (ECC), IEEE Conference on Control Technology and Applications (CCTA), IEEE Conference on Decision and Control (CDC), IFAC Workshop on Cyber-Physical and Human Systems (CPHS), IFAC World Congress, International Conference on Control, Decision and Information Technologies (CoDIT), International Conference on System Theory, Control and Computing (ICSTCC), Mediterranean Conference on Control and Automation (MED)

PUBLICATIONS

Journal papers

1. T. Srivastava, **C. Bernardo**, C. Altafini, F. Vasca, "Connectivity and synchronization in bounded confidence Kuramoto oscillators", *IEEE Control Systems Letters*, vol. 8, pp. 874–879, 2024

2. L. Wang, G. Chen, **C. Bernardo**, Y. Hong, G. Shi, C. Altafini, "Social power games in concatenated opinion dynamics", *IEEE Transactions on Automatic Control*, vol. 69, no. 11, pp. 7614–7629, 2024

3. **C. Bernardo**, C. Altafini, A. V. Proskurnikov, F. Vasca, "Bounded confidence opinion dynamics: A survey", *Automatica*, vol. 159, pp. 1–42, 2024

4. **C. Bernardo**, L. Wang, M. Fridahl, C. Altafini, "Quantifying leadership in climate negotiations: A social power game", *PNAS Nexus*, vol. 11, no. 7, pp. 1–12, 2023

5. L. Wang, **C. Bernardo**, Y. Hong, F. Vasca, G. Shi, C. Altafini, "Consensus in concatenated opinion dynamics with stubborn agents", *IEEE Transactions on Automatic Control*, vol. 68, no. 7, pp. 4008–4023, 2023

6. **C. Bernardo**, C. Altafini, F. Vasca, "Finite-time convergence of opinion dynamics in homogeneous asymmetric bounded confidence models", *European Journal of Control*, vol. 68, pp. 1–6, 2022

7. **C. Bernardo**, F. Vasca, R. Iervolino, "Heterogeneous opinion dynamics with confidence thresholds adaptation", *IEEE Transactions on Control of Network Systems*, vol. 9, no. 3, pp. 1068–1079, 2022

8. **C. Bernardo**, L. Wang, F. Vasca, Y. Hong, G. Shi, C. Altafini, "Achieving consensus in multilateral international negotiations: The case study of the 2015 Paris Agreement on climate change", *Science Advances*, vol. 7, no. 51, pp. 1–16, 2021

9. F. Vasca, **C. Bernardo**, R. Iervolino, "Practical consensus in bounded confidence opinion dynamics", *Automatica*, vol. 129, pp. 1–11, 2021

Conference papers

1. **C. Bernardo**, M. Catillo, A. Pecchia, F. Vasca, U. Villano, "Bipartite graph modeling for the analysis of fake news propagation", *International Conference on Advances in Social Networks Analysis and Mining*, Rende, Italy, September 2024

2. **C. Bernardo**, D. Ricci, F. Vasca, "Homophily detection in opinion dynamics from Reddit discussions", *International Conference on Advances in Social Networks Analysis and Mining*, Rende, Italy, September 2024

3. T. Srivastava, **C. Bernardo**, S. Baccari, F. Vasca, "An experimental verification for Hegselmann–Krause opinion dynamics", *International Conference on System Theory, Control and Computing*, pp. 209–214, Timisoara, Romania, October 2023

4. T. Srivastava, **C. Bernardo**, C. Altafini, F. Vasca, "Analyzing the effects of confidence thresholds on opinion clustering in homogeneous Hegselmann–Krause models", *Mediterranean Conference on Control and Automation*, pp. 587–592, Limassol, Cyprus, June 2023

5. A. Pepiciello, **C. Bernardo**, J. L. Domínguez-García, "Modeling of multi-energy systems as multilayer networks", *IEEE PowerTech*, pp. 1–6, Belgrade, Serbia, June 2023

6. L. Wang, **C. Bernardo**, Y. Hong, F. Vasca, G. Shi, C. Altafini, "Achieving consensus in spite of stubbornness: Time-varying concatenated Friedkin–Johnsen models", *IEEE Conference on Decision and Control*, pp. 4964–4969, Austin, Texas, December 2021

7. **C. Bernardo**, F. Vasca, "A mixed logical dynamical model of the Hegselmann–Krause opinion dynamics", *IFAC-PapersOnLine*, vol. 53, no. 2, pp. 2826–2831, Berlin, Germany, July 2020

Books

1. F. Vasca, D. Ricci, **C. Bernardo**, "Analisi numerica delle reti sociali: Una guida operativa all'uso di MATLAB e R" ["Numerical analysis of social networks: An application guidance to the use of MATLAB and R"], Independently published, ISBN: 979-8407408925, 2022

Chapters in books

1. A. Pepiciello, J. L. Domínguez-García, **C. Bernardo**, "Complex network analysis of multi-energy Systems", in C. Ocampo-Martinez, N. Quijano (eds.), *Energy systems integration for multi-energy systems*, Springer, 2025

2. I. Marotta, **C. Bernardo**, A. Moretti, F. Giangregorio, F. Vasca, "Social network analysis for welcome policies: An empirical study from small Italian municipalities", in G. Giordano, M. Restaino, A. Salvini (eds.), *Methods and applications in social networks analysis*, FrancoAngeli, 2021

3. **C. Bernardo**, G. D. Giorgione, I. Marotta, F. Vasca, "La rete di comunicazione" ["The communication network"], in C. Di Perna, G. D. Giorgione, A. Moretti (eds.), *Ricucire le campanelle*, Editrice AVE, 2019

Theses

1. **C. Bernardo**, "Convergence analysis of heterogeneous opinion dynamics with bounded confidence and stubbornness", DOI: 10.13140/RG.2.2.25699.43044, 2022

Magazine articles

1. F. Vasca, D. Ricci, A. Moretti, **C. Bernardo**, "Fare rete per costruire politiche d'inclusione: Il caso-studio delle cooperative di comunità nei piccoli comuni" ["Networking to build inclusion policies: The case study of community cooperatives in small municipalities"], *Welfare Oggi*, no. 1, pp. 5–10, 2021

Posters

1. **C. Bernardo**, L. Wang, M. Fridahl, C. Altafini, "Quantifying leadership in climate negotiations: A social power game", *ELLIIT Annual Workshop*, Lund, Sweden, March 2024

2. **C. Bernardo**, F. Vasca, C. Altafini, "Bounded confidence model: Analysis of steady-state behaviors and convergence time", *ELLIIT Annual Workshop*, Linköping, Sweden, October 2022

3. D. Ricci, F. Vasca, **C. Bernardo**, B. Cutispoto, A. Moretti, "Social network analysis per reti di comunità" ["Social network analysis for community networks"], *Workshop "Le persone con disabilità tra società, economia e diritto: questioni aperte e prospettive di riforma"*, Benevento, Italy, September 2022

Project reports

1. D. Ricci, **C. Bernardo**, F. Vasca, "Progetti formativi personalizzati con budget educativi. Valutazione dimpatto" ["Personalized educational projects with educational budgets. Impact assessment"], Project *PFP. Progetti Formativi Personalizzati*, 2024

2. D. Ricci, B. Cutispoto, M. F. Ocone, **C. Bernardo**, A. Moretti, F. Vasca, "Reti interorganizzative per progetti formativi personalizzati. Una ricerca-azione sui nodi territorial di Benevento, Fondi e Torino" ["Interorganizational networks for personalized educational projects. An action-research on the territorial nodes of Benevento, Fondi, and Turin"], Project *PFP. Progetti Formativi Personalizzati*, 2024

3. D. Ricci, B. Cutispoto, **C. Bernardo**, A. Moretti, F. Vasca, "La rete dei disconnessi. Una mappatura territoriale per il contrasto alle povertà educative" ["The network of disconnected ones. A territorial mapping for the educational poverty reduction"], Project *PFP. Progetti Formativi Personalizzati*, 2023

4. D. Ricci, B. Cutispoto, **C. Bernardo**, A. Moretti, F. Vasca, "Fare rete per costruire nuove alleanze educative. Il caso-studio del nodo territoriale di Torino" ["Networking to build new educational alliances. The case study of the territorial node of Turin"], Project *PFP. Progetti Formativi Personalizzati*, 2022

5. D. Ricci, F. Vasca, **C. Bernardo**, "Reti interorganizzative per cooperative di comunità. Analisi di rete per politiche di accoglienza nelle periferie cittadine" ["Interorganizational networks for cooperatives of community. Network analysis for welcome policies on city outskirts"], Project *I Piccoli Comuni del Welcome*, 2020

Awards

Talks at institutions/events

- Seminar "Analyzing leadership in climate change negotiations with a social power game", Linköping University, Linköping, Sweden, March 26, 2024

- Seminar "Analyzing leadership strategies in climate change negotiations with a social power game", *ELLIIT Annual Workshop*, Lund, Sweden, March 8, 2024

- Seminar "Quantifying leadership in climate negotiations: A social power game", University of Sannio, Benevento, Italy, July 12, 2023

- Presentation of the research article "Finite-time convergence of opinion dynamics in homogeneous asymmetric bounded confidence models", *European Control Conference*, London, UK, July 15, 2022

- Presentation of the study "Achieving consensus in spite of stubbornness in opinion dynamics: A model and an application", *Reglermöte*, Luleå, Sweden, June 8, 2022

- Organization and presentation of the workshop "Using MATLAB for social networks analysis", *European Conference on Social Networks*, Napoli, Italy, September 6, 2021 [Virtual]

- Presentation of the study "Practical clustering in bounded confidence opinion dynamics", *Automatica.it*, Catania, Italy, September 8, 2021 [Virtual]

- Presentation of the study "A profiling algorithm based on multilayer networks", *Networks*, Washington, USA, July 7, 2021 [Virtual]

- Presentation of the study "Hegselmann–Krause model in mixed logical dynamical formulation", *Automatica.it*, Cagliari, Italy, September 9, 2020 [Virtual]

- Presentation of the research article "A mixed logical dynamical model of the Hegselmann–Krause opinion dynamics", *IFAC World Congress*, Berlin, Germany, July 12, 2020 [Virtual]

- Presentation of the study "A social network model for welcome policies: An empirical study from small Italian municipalities", *International Workshop on Social Network Analysis*, Vietri sul Mare (SA), Italy, October 30, 2019

- Presentation of the study "Confidence thresholds sensitivity in heterogeneous opinion dynamics", *Automatica.it*, Ancona, Italy, September 12, 2019

Other activities

Member of the spin-off company *Nesyt. Networks, Systems, Technologies*	*2019–⋯*
Media manager of ADI (Associazione dottorandi e dottori di ricerca in Italia) Benevento	*2019–2022*
Partecipation in *Quarantine Hackathon* organized by IEEE SIGHT Egypt Section	*2020*
Participation in Math competitions	*2011–2012*

Affiliations

Member of *IEEE Control Systems Society*	*2020–⋯*
IEEE Member	*2019–⋯*
Ordinary member of SIDRI (Società italiana del dottorato di ricerca)	*2019–⋯*
Member of ADI (Associazione dottorandi e dottori di ricerca in Italia)	*2018–⋯*
Member of *Alumni Unisannio*	*2018–⋯*