

HULYA SEFEROGLU

Assistant Professor, ECE, UIC

CONTACT INFO

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RESEARCH INTERESTS

My research interests are in the broader area of networking: design, analysis, and implementation of network protocols and algorithms. I am particularly interested in resilient networks, Device-to-Device (D2D) networking, communication and computation for Internet of Things (IoT), network coding, control for connected vehicles and wireless networks, and multimedia. My primary research goal is to design network architectures so that they are cost and energy efficient, scalable, secure, and to address increasing demand for bandwidth, quality, reliable communications, and connectivity.

EDUCATION

University of California, Irvine (Sept. 2006-Dec. 2010)

Ph.D. in Electrical and Computer Engineering

Sabanci University, Istanbul, Turkey (Sept. 2003-June 2005)

M.S. in Electrical Engineering and Computer Science

Istanbul University, Istanbul, Turkey (Sept. 1999-June 2003)

B.S. in Electrical Engineering

WORK EXPERIENCE

Assistant Professor, University of Illinois at Chicago (Oct. 2013-present)

Department of Electrical and Computer Engineering (also affiliated with the Computer Science Department)

Postdoctoral Associate, Massachusetts Institute of Technology (Nov. 2011-Oct. 2013)

Laboratory for Information and Decision Systems & Department of Aeronautics and Astronautics

Postdoctoral Scholar, University of California, Irvine (Jan. 2011-Oct. 2011)

Electrical Engineering and Computer Science Department

Research Assistant, University of California, Irvine (Sept. 2006-Dec. 2010)

Electrical Engineering and Computer Science Department

Research Intern, AT&T Labs Research (Summer 2010)

Research Intern, Docomo USA Labs (Summer 2008)

Research Intern, Microsoft Research Cambridge (Summer 2007)

PUBLICATIONS

Journal Papers: Refereed

1. Y. Keshtkarjahromi, H. Seferoglu, R. Ansari, A. Khokhar, "Device-to-Device Networking Meets Cellular via Network Coding," in *IEEE Transactions on Networking*, 2017.
2. Y. Keshtkarjahromi, H. Seferoglu, R. Ansari, A. Khokhar, "Content-Aware Network Coding over Device-to-Device Networks," in *IEEE Transactions on Mobile Computing*, 2016.
3. A. Le, L. Keller, B. Cici, H. Seferoglu, C. Fragouli, A. Markopoulou, "MicroCast: Cooperative Video Streaming Using Cellular and D2D Connections," in *IEEE/ACM Transactions on Networking*, 2015.
4. H. Seferoglu, E. Modiano, "TCP-Aware Backpressure Routing and Scheduling," in *IEEE Transactions on Mobile Computing*, 2015.
5. H. Seferoglu, E. Modiano, "Separation of Routing and Scheduling in Backpressure-Based Wireless Networks," in *IEEE/ACM Transactions on Networking*, 2015.
6. H. Seferoglu, A. Markopoulou, "Network Coding-Aware Queue Management for TCP Flows over Coded Wireless Networks," in *IEEE/ACM Transactions on Networking*, vol. 22(4), pp. 1297-1310, Aug. 2014.
7. H. Seferoglu, A. Markopoulou, U. C. Kozat, M. R. Civanlar, J. Kempf, "Dynamic FEC Algorithms for TFRC Flows," in *IEEE Transactions on Multimedia*, vol. 12(8), pp. 869-885, Dec. 2010.
8. H. Seferoglu, A. Markopoulou, "Video-Aware Opportunistic Network Coding over Wireless Networks," in *IEEE JSAC on Network Coding for Wireless Communication Networks*, vol. 27(5), pp. 713-728, June 2009.
9. H. Seferoglu, O. Gurbuz, O. Ercetin, Y. Altunbasak, "Rate Distortion-Based Real-Time Wireless Video Streaming," in *Elsevier Signal Processing: Image Communication*, vol. 22(6), pp. 529-542, July 2007.

Conferences: Refereed Papers

1. D. Tuninetti, B. Smida, N. Devroye, H. Seferoglu, "Scheduling on Gaussian Broadcast Channel with Hard Deadlines," in *Proc. of IEEE ICC*, Kansas City, MO, May 2018.
2. E. Koyuncu, R. Khodabakhsh, N. Surya, H. Seferoglu, "Deployment and Trajectory Optimization for UAVs: A Quantization Theory Approach," in *Proc. of IEEE WCNC*, Barcelona, Spain, April 2018.
3. R. Khodabakhsh, H. Seferoglu, "AACT: Application-Aware Cooperative Time Allocation for Internet of Things," in *Proc. of IEEE GLOBECOM*, Singapore, Dec. 2017.
4. Y. Keshtkarjahromi, H. Seferoglu, R. Ansari, A. Khokhar, "D2D Meets Cellular Using Network Coding," in *ACM CoNext Student Workshop*, Irvine, CA, Dec. 2016.
5. S. Zhou, H. Seferoglu, "Connectivity-Aware Traffic Phase Scheduling for Heterogeneously Connected Vehicles," in *Proc of ACM CarSys Workshop of MobiCom*, New York, NY, Oct. 2016.
6. A. Singh, Y. Xing, H. Seferoglu, "Energy-Aware Cooperative Computation in Mobile Devices," in *Proc. of IFIP Networking*, Vienna, Austria, May 2016.
7. S. Zhou, H. Seferoglu, "Blocking Avoidance in Transportation Systems," in *Proc. of IEEE Allerton*, Urbana, IL, Sep. 2015.
8. Y. Keshtkarjahromi, H. Seferoglu, R. Ansari, A. Khokhar, "Network Coding for Cooperative Mobile Devices with Multiple Interfaces," in *Proc. of IEEE Milcom*, Tampa, FL, Oct. 2015.
9. Y. Keshtkarjahromi, H. Seferoglu, R. Ansari, A. Khokhar, "Content-Aware Instantly Decodable Network Coding over Wireless Networks," in *Proc. of IEEE ICNC*, Anaheim, CA, Feb. 2015.
 - a. **Received the best poster award in N²WOMEN workshop 2014.**
10. H. Seferoglu, Y. Xing, "Device-Centric Cooperation in Mobile Networks," in *Proc. of IEEE CloudNet*, Luxembourg, Oct. 2014.

11. C. Meng, A. Markopoulou, H. Seferoglu, K. W. Shum, C. Chang, "Multicast Packing for Coding across Multiple Unicasts," in *Proc. of IEEE NetCod*, Calgary, Canada, June 2013.
12. H. Seferoglu, E. Modiano, "Diff-Max: Separation of Routing and Scheduling in Backpressure-Based Wireless Networks," in *Proc. of IEEE INFOCOM*, Turin, Italy, April 2013.
13. L. Keller, A. Le, B. Cici, H. Seferoglu, C. Fragouli, A. Markopoulou, "MicroCast: Cooperative Video Streaming on Smartphones," in *Proc. of ACM MobiSys*, Low Wood Bay, Lake District, UK, June 2012.
 - a. **Finalist for the best paper award.**
 - b. **Won the first place in the general category of the AMESE competition.**
14. H. Seferoglu, A. Markopoulou, M. Medard, "NCAPQ: Network Coding-Aware Priority Queuing for UDP Flows over COPE," in *Proc. of IEEE NetCod*, Beijing, China, July 2011.
15. H. Seferoglu, A. Markopoulou, K. K. Ramakrishnan, "I²NC: Intra- and Inter-Session Network Coding for Unicast Flows in Wireless Networks," in *Proc. of IEEE INFOCOM*, Shanghai, China, April 2011.
 - a. **Related news article appeared in AT&T Labs Research Magazine.**
16. H. Seferoglu, A. Markopoulou, "Network Coding-Aware Queue Management for Unicast Flows over Coded Wireless Networks," in *Proc. of IEEE NetCod*, Toronto, Canada, June 2010.
17. H. Seferoglu, A. Markopoulou, "Delay-Optimized Network Coding for Video Streaming over Wireless Networks," in *Proc. of IEEE ICC*, Cape Town, South Africa, May 2010.
18. H. Seferoglu, A. Markopoulou, U. C. Kozat, "Network Coding-Aware Rate Control and Scheduling in Wireless Networks," in *Proc. of IEEE ICME*, New York, NY, June 2009.
19. H. Seferoglu, A. Markopoulou, "Distributed Rate Control for Video Streaming over Wireless Networks with Inter-Session Network Coding," in *Proc. of IEEE Packet Video*, Seattle, WA, May 2009.
20. H. Seferoglu, U. C. Kozat, M. R. Civanlar, J. Kempf, "Congestion State-Based Dynamic FEC Algorithm for Media Friendly Transport Layer," in *Proc. of IEEE Packet Video*, Seattle, WA, May 2009.
21. H. Seferoglu, A. Markopoulou, "Opportunistic Network Coding for Video Streaming over Wireless," in *Proc. of IEEE Packet Video*, Lausanne, Switzerland, Nov. 2007.
22. H. Seferoglu, O. Gurbuz, O. Ercetin, Y. Altunbasak, "Video Streaming to Multiple Clients over Wireless Local Area Networks," in *Proc. of IEEE ICIP*, Atlanta, GA, Oct. 2006.
23. H. Seferoglu, Y. Altunbasak, O. Gurbuz, O. Ercetin, "Rate Distortion Optimized Joint ARQ-FEC for Real-Time Wireless Multimedia," in *Proc. of IEEE ICC*, Seoul, Korea, May 2005.

Conferences: Invited Papers

1. Y. Xing, H. Seferoglu, "Device-Aware Routing and Scheduling in Multi-Hop Device-to-Device Networks," in *Proc. of IEEE ITA*, San Diego, CA, Feb. 2017
2. S. Zhou, H. Seferoglu, E. Koyuncu, "Blocking Avoidance in Wireless Networks," in *Proc. of IEEE ITA*, San Diego, CA, Feb. 2016.
3. H. Seferoglu, E. Modiano, "TCP-Aware Backpressure Routing and Scheduling," in *Proc. of IEEE ITA*, San Diego, CA, Feb. 2014.
4. H. Seferoglu, L. Keller, B. Cici, A. Le, A. Markopoulou, "Cooperative Video Streaming on Smartphones," in *Proc. of IEEE Allerton*, Allerton, IL, Sep. 2011.
5. H. Seferoglu, A. Lakshimantha, A. Ganesh, P. Key, "Dynamic Decentralized Multi-Channel MAC Protocols," in *Proc. of IEEE ITA*, San Diego, CA, Jan. 2008.

Posters/Misc. Publications

1. Y. Keshtkarjahromi, H. Seferoglu, R. Ansari, Ashfaq Khokhar, "Content-Aware Instantly Decodable Network Coding over Wireless Networks," Poster Presentation in *N2Women Workshop*, Chicago, IL, August, 2014. **(Received the Best Poster Award).**

2. L. Keller, A. Le, B. Cici, H. Seferoglu, C. Fragouli, A. Markopoulou, "Microcast: Cooperative Video Streaming on Smartphones (Demo and Poster)," in *ITW* (Sep. 2012), *ACM MobiSys* (June 2012), *ACM HotMobile* (Feb. 2012), *ITA Workshop* (Feb. 2012).
3. H. Seferoglu, "Cross-Layer Optimization of Coded Wireless Networks (Poster)," in *ITA Workshop*, San Diego, CA, Feb. 2011.
4. H. Seferoglu, A. Markopoulou, "Application-Aware Network Coding (Poster)," in *ITA Workshop*, San Diego, CA, Feb. 2010.
5. A. Markopoulou, H. Seferoglu, "Network Coding Meets Multimedia: Opportunities and Challenges," in *IEEE MMTC E-Letter*, vol. 4(1), pp. 12-15, Feb. 2009.

TEACHING & ADVISING EXPERIENCE

ECE Department, UIC

1. Courses
 - a. ECE 436 (Computer Communication Networks II), Spring Semesters 2014 - 2017.
 - b. ECE 533 (Advanced Computer Communication Networks), Fall Semesters 2014 - 2016.
2. Research Supervision
 - a. Current postdoctoral associates
 - i. Yasaman Keshkarjahromi
 - b. Current Ph.D. Students
 - i. Yuxuan Xing
 - ii. Shanyu Zhou
 - iii. Zohreh Ovaisi (co-advised with N. Devroye, B. Smida, D. Tuninetti)
 - c. Graduated M.S. Thesis Students
 - i. Raheleh Khodabakhsh, completed M.S. thesis on "Application-Aware Cooperative Time Scheduling for Internet of Things," Dec. 2017.
 - ii. Ajita Singh, completed M.S. thesis on "Energy-Aware Computation in Mobile Devices" Dec. 2015.
 - iii. Adeleke Oluwamayowa, completed M.S. thesis on "Software-Defined Network Overlays" May 2015.
 - d. Undergraduate Students
 - i. Pedro De La Torre, GPIP intern (freshman student), Summer 2016. He analyzed the impact of packet sizes on transmission performance of TCP connections.
 - ii. Tadas Petraitis, GPIP intern (freshman student), Summer 2015. He developed multi-player games on Android-based mobile devices.
 - iii. Kevin Ngo, GPIP intern (freshman student), Summer 2014. He developed client-server networking algorithm on Android-based mobile devices.
 - e. External Committees
 - i. External member of the Ph.D. thesis committee of Mohammad Esmaeilzadeh Fereydani in the Australian National University, Jan. 2016 (Advisor: P. Sadeghi).

FUNDING

1. 09/16/17 – 09/15/20: National Institute of Standards and Technology (NIST), total award to UIC is \$270,000 (H. Seferoglu's share is 100%), H. Seferoglu (UIC PI), "Modeling and Development of Resilient Communication for First Responders in Disaster Management". In collaboration with KK. Ramakrishnan (project PI) from UC Riverside, M. Yuksel (Co-PI) from UCF, and J. Chen (Co-PI) from Rutgers.
2. 04/24/17 – 04/23/18: Department of Defense (DoD), total award to UIC is \$598,318 (H.

Seferoglu's share is 8%), D. Erricolo (PI) and N. Devroye, M. Dutta, R. R. Alonso, A. Salim, H. Seferoglu, J. Shi, B. Smida, M. Soltanian, M. Stroschio, D. Tuninetti (Co-PIs), "Three birds with one stone: high-frequency instrumentation for semiconductor device characterization, radar and communication system measurements".

- 01/01/17 – 12/31/17: US Army Research Lab, total award to UIC is \$159,827 (H. Seferoglu's share is 100%), H. Seferoglu (UIC PI), "Coded Cooperative Computation for Internet of Battlefield Things (IoBTs)". In collaboration with S. El Rouayheb (project PI) from Rutgers.
- 05/16/16 – 05/15/17: UIC College of Engineering Seed Fund, total award to UIC is \$30,000 (H. Seferoglu's share is 25%), N. Devroye (PI) and H. Seferoglu, B. Smida, D. Tuninetti (Co-PIs), "On the Art of Communicating Highly Reliable Short Packets with Low Latency".
- 05/01/15 – 12/31/16: UIC College of Engineering Seed Fund, total award to UIC is \$35,000 (H. Seferoglu's share is 100%), H. Seferoglu (PI), "Practical Network Control for Mobile Devices".
- 08/16/15 – 12/31/16: UIC College of Engineering Annual Fund, total award to UIC is \$24,407 (H. Seferoglu's share is 100%), H. Seferoglu (PI), "Integrating Mobile Technologies in ECE Curriculum".
- 01/01/2015 – 12/31/16: Elizabeth Morse Genius Charitable Trust, total award to UIC is \$75,790 (H. Seferoglu's share is 25%). R. Ansari (PI) and H. Seferoglu (Co-PI), "Algorithm Development for Assistive Technology for Blind Pedestrians to Cross Streets".

PATENTS

- L. Keller, A. Le, B. Cici, H. Seferoglu, C. Fragouli, A. Markopoulou, "System and Method for Cooperative Data Streaming," US 20130332621 A1.
- H. Seferoglu, A. Markopoulou, K. K. Ramakrishnan, "Method and Apparatus to Utilize Network Coding in a Wireless Network," US 8867510 B2.
- H. Seferoglu, U. C. Kozat, M. R. Civanlar, J. Kempf, "Method and Apparatus for Reliable Media Transport," US 8489954 B2.

HONORS AND DISTINCTIONS

- Best paper award finalist in ACM MobiSys (2012)
- CPCC Fellowship, University of California, Irvine (2006-2008)
- Graduate Fellowship from Sabanci University (2003-2006)
- Ranked 1st in the Electrical Engineering Department, Istanbul University (2003)
- Scholarship due to academic excellence, Istanbul University Board (2000-2003)
- Scholarship due to academic excellence, ESO (1999-2003)

PROFESSIONAL ACTIVITIES

Editor

2017 – 2019: Associate Editor of IEEE/ACM Transactions on Networking.

2016 – 2019: Executive Editor of Transactions on Emerging Telecommunications Technologies.

2015: Guest Editor of EURASIP Journal on Advances in Signal Processing, Special Issue on Network Coding.

Technical Program Committee Member

2017: IEEE ICNP, WTS 2017

2016: Co-Chair of Student Workshop of CoNext

2015: IEEE Globecom, IEEE Rawnet Workshop, IEEE PIMRC
2014: IEEE PIMRC, IEEE INFOCOM Workshop on Communication and Networking Techniques for Contemporary Video
2012: IEEE NetCod
2011: IEEE ICCCN
2010: IEEE CCNC

Reviewer for Journals

IEEE Transactions on Networking, IEEE Transactions on Information Theory, IEEE Transactions on Multimedia, IEEE JSAC, IEEE Transactions on Mobile Computing, IEEE Sensors Journal, Multimedia Systems, IEEE Network Magazine, IEEE Transactions on Wireless Communications, IEEE Transactions on Parallel and Distributed Systems, IEEE Transactions on Circuits and Systems for Video Technology, IEEE Transactions on Vehicular Technology, IEEE Communications Letters, IEEE Transactions on Communications, Journal of Communication Systems, Elsevier Information Sciences.

Reviewer for Conferences

ISIT 2017, WTS 2017, CoNext Student Workshop 2016, Rawnet Workshop 2016, Globecom 2015, ISIT 2015, ISIT 2014, MobiHoc 2014, INFOCOM 2014, NetCod 2013, ISIT 2013, VTC 2013, INFOCOM 2013, WCSP 2012, Globecom 2012, NetCod 2012, ISIT 2012, ICME 2012, INFOCOM 2012, Globecom 2011, ICCCN 2011, ISITA 2010, CCNC 2010, ISIT 2009, NetCod 2009, CCNC 2009, IWCMC 2008, ICC 2008, Globecom 2006.

Member

Key member of Multimedia Processing for Communications Interest Group (MPCIG) of IEEE Communications Society Multimedia Communications Technical Community (2015-2016), IEEE, WITHITS, N²WOMEN, WISEST.