Murat KARAKUS

Ankara University
Faculty of Engineering/Department of Software Engineering
50. Yil Campus, 06830 Golbasi, ANKARA
E-mail: mrtkarakus@ankara.edu.tr   muratkarakus60@gmail.com

Education

Ph.D. in Computer Science, GPA 3.80/4.00   *December 2018*
  Department of Computer and Information Science
  Indiana U. - Purdue U. Indianapolis (IUPUI) , Indianapolis, IN USA

M.Sc. in Computer Science, GPA 8.00/9.00   *April 2013*
  Department of Computer Science, Engineering and Physics,
  University of Michigan-Flint, Flint, MI USA

B.S. in Mathematics, GPA 3.34/4.00   *June 2009*
  Suleyman Demirel University, Isparta, Türkiye

Professional Experience

Associate Professor, Ankara University, Ankara, Türkiye   *September 2024 - Present*
  Department of Software Engineering

Assistant Professor, Ankara University, Ankara, Türkiye   *September 2022 - Present*
  Department of Software Engineering

Assistant Professor, Bayburt University, Bayburt, Türkiye   *September 2019 - September 2022*
  Department of Computer Technology and Programming

Lecturer, Bayburt University, Bayburt, Türkiye   *February 2019 - September 2019*
  Department of Computer Technology and Programming

Research Interests

New network architectures (e.g. Software-Defined Networking (SDN)); Blockchain technology; Internet of Things (IoT); Network Security; Cloud Computing; Scalability; Service Pricing; Quality of Service (QoS); Routing

Digital Databases for Academic Profile

Google Scholar	*https://scholar.google.com/citations?user=fGkZEUsAAAAJ&hl=en*
Scopus	*https://www.scopus.com/authid/detail.uri?authorId=54393351700*
ORCID	*https://orcid.org/0000-0002-8893-7345*
ResearchGate	*https://www.researchgate.net/profile/Murat_Karakus3*

Refereed Journal Publications

[1] **M. Karakus**, "GATE-BC: Genetic Algorithm-Powered QoS-Aware Cross-Network Traffic Engineering in Blockchain-Enabled SDN," *IEEE Access*, vol. 12, pp. 36523–36545, 2024, **Q2, SCI-E**.

[2] **M. Karakus**, E. Guler, and S. Uludag, "Smartcontractchain (SC^2): Cross-ISP QoS Traffic Management Framework with SDN and Blockchain," *Peer-to-Peer Networking and Applications*, vol. 16, pp. 3003–3020, Nov 2023, **Q2, SCI-E**.

[3] **M. Karakus**, "Implementation of Blockchain-Assisted Source Routing for Traffic Management in Software-Defined Networks," *Düzce University Journal of Science & Technology*, vol. 11, no. 3, pp. 1250 – 1268, 2023, **TR-DIZIN**.

[4] S. W. Turner, **M. Karakus**, E. Guler, and S. Uludag, "A Promising Integration of SDN and Blockchain for IoT Networks: A Survey," *IEEE Access*, vol. 11, pp. 29800–29822, 2023, **Q2, SCI-E**.

[5] E. Guler, **M. Karakus**, and S. Uludag, "Blockchain-Enhanced Cross-ISP Spectrum Assignment Framework in SDONs: SpectrumChain," *Computer Networks*, vol. 223, p. 109579, 2023, **Q1, SCI-E**.

[6] E. Guler, **M. Karakus**, and F. Ayaz, "Genetic Algorithm Enabled Virtual Multicast Tree Embedding in Software-Defined Networks," *Journal of Network and Computer Applications*, vol. 209, p. 103538, 2023, **Q1, SCI-E**.

[7] **M. Karakus**, E. Guler, and S. Uludag, "QoSChain: Provisioning Inter-AS QoS in Software-Defined Networks with Blockchain," *IEEE Transactions on Network and Service Management*, vol. 18, no. 2, pp. 1706–1717, 2021, **Q2, SCI-E**.

[8] **M. Karakus** and A. Durresi, "An Economic Framework for Analysis of Network Architectures: SDN and MPLS Cases," *Journal of Network and Computer Applications*, vol. 136, pp. 132 – 146, 2019. **Q1, SCI-E**.

[9] **M. Karakus** and A. Durresi, "Economic Viability of Software Defined Networking (SDN)," *Computer Networks*, vol. 135, pp. 81–95, 2018. **Q1, SCI-E**.

[10] **M. Karakus** and A. Durresi, "Quality of Service (QoS) in Software Defined Networking (SDN): A survey," *Journal of Network and Computer Applications*, vol. 80, pp. 200–218, 2017. **Q1, SCI-E**.

[11] **M. Karakus** and A. Durresi, "A survey: Control Plane Scalability Issues and Approaches in Software-Defined Networking (SDN)," *Computer Networks*, vol. 112, pp. 279–293, 2017. **Q1, SCI-E**.

Refereed Conference Proceedings

[1] R. S. Kiziltepe, E. Ezin, and **M. Karakus**, "A Comparative Study of ML Models on Large-Scale Turkish Sentiment Datasets," in *15th Innovations in Intelligent Systems and Applications Conference 2024 (ASYU 2024)*, (Ankara, Turkiye), Oct 2024.

[2] **M. Karakus**, E. Guler, F. Ayaz, and S. Uludag, "QoSCAPE: QoS-Centric Adaptive Path Engineering with Blockchain-Enabled Reinforcement Learning," in *15th Innovations in Intelligent Systems and Applications Conference 2024 (ASYU 2024)*, (Ankara, Turkiye), Oct 2024.

[3] V. Hayyolalam, A. Zekiye, H. Abuzahra, O. Ozkasap, **M. Karakus**, E. Guler, and S. Uludag, "Synergistic Integration of Blockchain and Software-Defined Networking in the Internet of Energy Systems," in *IEEE 6th International Conference on Blockchain Computing and Applications 2024 (IEEE BCCA 2024)*, 2024.

[4] A. B. Gorgulu, H. O. Kamali, **M. Karakus**, E. Guler, and S. Uludag, "A proof of concept for blockchain-enhanced smart parking system with sdn: Bepas," in *2024 IEEE International Black Sea Conference on Communications and Networking (BlackSeaCom)*, pp. 316–319, 2024.

[5] M. Osmanoglu, **M. Karakus**, B. Tugrul, and S. Demir, "Design of a blockchain-based organ donation and transplantation management framework," in *Proceedings of 9th International Congress on Information and Communication Technology*, pp. 155–164, Springer Nature Singapore, 2024.

[6] E. Guler, F. Ayaz, **M. Karakus**, and D. Hanbay, "Particle swarm optimization-enhanced virtual multicast trees embedding in sdns," in *2023 IEEE International Black Sea Conference on Communications and Networking (BlackSeaCom)*, pp. 265–270, 2023.

[7] C. B. Yildirim, F. Ayaz, **M. Karakus**, and E. Guler, "Yazılım Tanımlı Çoklu Ağlarda Yönlendirilmiş Döngüsüz Graf Modelli Dijital Cüzdan Teknolojileri ile Servis Kalitesi Destekli Yönlendirme Mimarisi," in *5th International Conference on Applied Sciences*, pp. 157–167, 2023.

[8] Z. Onder, F. Ayaz, **M. Karakus**, and E. Guler, "Yazılım Tanımlı Çoklu Ağlarda Makine Öğrenmesi ve Blokzinciri ile Geliştirilmiş Servis Kalitesi Destekli Yönlendirme Mimarisi," in *5th International Conference on Applied Sciences*, pp. 134–148, 2023.

[9] E. Guler, **M. Karakus**, and S. Uludag, "Evaluating Path Selection Strategies with Blockchain-based Routing in Multi-Domain SDNs," in *2022 International Balkan Conference on Communications and Networking (BalkanCom)*, pp. 6–10, 2022.

[10] E. Guler, **M. Karakus**, and S. Uludag, "SpectrumChain: An Efficient Spectrum Management Framework in Blockchain-Enabled Flexible SDONs," in *ICC 2022 - IEEE International Conference on Communications*, pp. 5744–5749, 2022.

[11] **M. Karakus** and E. Guler, "RoutingChain: A Proof-of-Concept Model for a Blockchain-Enabled QoS-Based Inter-AS Routing in SDN," in *2020 IEEE International Black Sea Conference on Communications and Networking (BlackSeaCom)*, pp. 1–6, 2020.

[12] **M. Karakus** and D. Ayberkin, "A First Look on QoS-enabled Inter-AS Routing in Software Defined Networks (SDN) using Smart Contracts of Blockchain Technology," in *3rd International Conference on Advanced Engineering Technologies (ICADET 2019)*, no. 25, pp. 904–911, October 2019.

[13] **M. Karakus** and A. Durresi, "Techno-Economic Analysis of Software-Defined Networking (SDN) and Various Control Plane Models," in *3rd International Conference on Advanced Engineering Technologies (ICADET 2019)*, no. 25, pp. 611–620, October 2019.

[14] **M. Karakus** and A. Durresi, "Economic Analysis of Software Defined Networking (SDN) Under Various Network Failure Scenarios," in *ICC 2019 - 2019 IEEE International Conference on Communications (ICC)*, pp. 1–6, May 2019.

[15] **M. Karakus** and A. Durresi, "Economic Impact Analysis of Control Plane Architectures in Software Defined Networking (SDN)," in *2018 IEEE International Conference on Communications (ICC)*, pp. 1–6, May 2018.

[16] **M. Karakus** and A. Durresi, "Service cost in software defined networking (SDN)," *Proceedings - International Conference on Advanced Information Networking and Applications, AINA*, pp. 468–475, 2017.

[17] **M. Karakus.** and A. Durresi, "Software-Defined Networking (SDN) Value Proposition over Different Network Architectures," *Proceedings - 1st International Balkan Conference on Communications and Networking, BalkanCom*, pp. 175–182, May 2017.

[18] **M. Karakus** and A. Durresi, "Economic viability of QoS in software defined networks (SDNs)," *Proceedings - International Conference on Advanced Information Networking and Applications, AINA*, vol. 2016-May, pp. 140–146, 2016.

[19] **M. Karakus** and A. Durresi, "A scalability metric for control planes in software defined networks (SDNs)," *Proceedings - International Conference on Advanced Information Networking and Applications, AINA*, vol. 2016-May, pp. 282–289, 2016.

[20] **M. Karakus** and A. Durresi, "A scalable inter-AS QoS routing architecture in software defined network (SDN)," *Proceedings - International Conference on Advanced Information Networking and Applications, AINA*, vol. 2015-April, pp. 148–154, 2015.

[21] S. Uludag, **M. Karakus**, and E. Guler, "Low-complexity 3D target tracking in Wireless Aerial Sensor Networks," *2014 IEEE International Conference on Communications, ICC 2014*, pp. 373–378, 2014.

[22] S. Uludag, E. Guler, **M. Karakus**, and S. W. Turner, "An Affordable Virtual Laboratory Infrastructure to Complement a Variety of Computing Classes," *J. Comput. Sci. Coll.*, vol. 27, pp. 158–166, May 2012.

[23] S. Uludag, **M. Karakus**, E. Guler, S. Turner, and A. Kita, "Assessment of a frugal, virtual and green computing lab infrastructure of the future," *Proceedings - Frontiers in Education Conference, FIE*, 2012.

[24] **M. Karakus**, S. Uludag, E. Guler, S. Turner, and A. Ugur, "Teaching computing and programming fundamentals via App Inventor for Android," *2012 International Conference on Information Technology Based Higher Education and Training, ITHET 2012*, 2012.

[25] E. Guler, S. Uludag, **M. Karakus**, and S. Turner, "Virtualized lab infrastructure on a budget for various computing and engineering courses," *2012 International Conference on Information Technology Based Higher Education and Training, ITHET 2012*, 2012.

[26] S. Uludag, **M. Karakus**, and S. Turner, "Implementing IT0/CS0 with scratch, app inventor for android, and lego mindstorms," *SIGITE'11 - Proceedings of the 2011 ACM Special Interest Group for Information Technology Education Conference*, pp. 183–189, 2011.

Refereed Book Chapters Publications

[1] **M. Karakus** and E. Guler, "Blokzincir ve Sosyal Ağ Platformlarının Kesişimi: Literatüre Genel Bir Bakış," in *Sosyal Ağ Analizinde Yapay Zekâ Yaklaşımları* (T. Parlar and F. S. Esen, eds.), pp. 91–109, Ankara: Nobel Akademik Yayıncılık, 2023.

[2] **M. Karakus**, "Blokzinciri ve Yazılım Tabanlı Ağlar," in *Siber Güvenlik ve Savunma: Blokzincir ve Kriptoloji* (Şeref Sağıroğlu and S. Akleylek, eds.), pp. 165–216, Ankara: Nobel Akademik Yayıncılık, 2021.

[3] **M. Karakus** and E. Guler, "Bulut Bilişimin Temelleri," in *Bilgisayar Bilimlerinde Teorik ve Uygulamalı Araştırmalar* (T. Talan and C. Aktürk, eds.), pp. 49–86, İstanbul: Efe Akademi Yayınevi, 2021.

[4] **M. Karakus** and E. Guler, "Nesnelerin İnterneti (Internet of Things)," in *Dijital Gelecek Dijital Dönüşüm* (İnci Erdoğan Tarakçı and B. Göktaş, eds.), pp. 331–363, İstanbul: Efe Akademi Yayınevi, 2021.

[5] E. Guler and **M. Karakus**, "Bilgisayar ve İletişim Ağları," in *Mühendislik Alanında Uluslararası Araştırmalar* (E. Aydemir, ed.), ch. 13, pp. 179–211, İstanbul: Eğitim Yayınevi, 2021.

[6] E. Guler and **M. Karakus**, "Yazılım Tanımlı Ağlarda Makine Öğrenmesi Uygulamaları," in *Bilgisayar Bilimlerinde Teorik ve Uygulamalı Araştırmalar* (T. Talan and C. Aktürk, eds.), ch. 12, pp. 271–296, İstanbul: Efe Akademi Yayınevi, 2021.

Teaching Experience

Graduate-Level Courses

- 803400815101 - Blockchain Technology and Smart Contracts (Graduate, Ankara University)

- Fİ122.1 - Advanced Algorithms (Graduate, Bayburt University)

- İM234.1 - Sensors and Applications (Graduate, Bayburt University)

- Network Security (Graduate, Turkish Military Academy)

- Data Structures and Algorithms (Graduate, Gendarmerie General Command)

- Project Management (Graduate, Gendarmerie General Command)

Undergraduate-Level Courses

- YMH218 - Data Structures (Undergraduate, Ankara University)

- YMH219 - Discrete Mathematics (Undergraduate, Ankara University)

- YMH213 - Vocational English (Undergraduate, Ankara University)

- BME1162 - Computer Programming (Undergraduate, Ankara University)

- YMH113 - Introduction to Computer Sciences (Undergraduate, Ankara University)

- YÖN212B.4.1 - Arduino Programming (Undergraduate, Bayburt University)

- YÖN407.2.1 - Computer Networks and Applications (Undergraduate, Bayburt University)

Associate-Level Courses

- BT110B3 - Calculus II (Associate Degree, Bayburt University)

- BT117B3.1 - Networking Fundamentals (Associate Degree, Bayburt University)

- BT2088B3.1 - Latest Trends in Computer Science (Associate Degree, Bayburt University)

- BT119B3.1 - Fundamentals on Cyber Security (Associate Degree, Bayburt University)

- BT208.5B3 - Internet Security (Associate Degree, Bayburt University)

- BT113B3 - Computer Hardware (Associate Degree, Bayburt University)

- BT108B3 - Information Technologies (Associate Degree, Bayburt University)

Academic Speeches

Invited Talks

- IEEE Blockchain Summit Türkiye 2022, Istanbul, Turkiye   *17-18 November 2022*
  Title: Crossroads of Blockchain and Software Defined Networks: Status Quo, Challenges, and Future Perspectives

Tutorial Talks

- IEEE International Mediterranean Conference on Communications and Networking 2023
  (IEEE MeditCom 2023), Dubrovnik, Croatia   *4-7 September 2023*
  Title: Unlocking New Horizons: SDN and Blockchain Synergy in IoT Networks

- IEEE 5th International Conference on Blockchain Computing and Applications 2023
  (IEEE BCCA 2023), Kuwait City, Kuwait   *24-26 October 2023*
  Title: Integration of SDN and Blockchain for IoT Networks: BC-enabled Software-Defined IoT (BC-SDIoT)

Grants

TUBITAK (Scientific and Technological Research Council of Türkiye) - 3501   *2021 - 2024*
PI, "Quality of Service Based Intelligent Routing Model Among Internet Service Providers: Intersection of Software Defined Network, Blockchain and Machine Learning Technologies", 2021 - 2024, 3501 Career Program

The European Commission Grant for ERASMUS Program   *January 2008 - June 2008*
Awarded money to pursue one semester abroad education in Technical Universit of Lodz by ERASMUS Student Exchange Program in Europe, Lodz, Poland

Travel Grants

IEEE BlackSeaCom 2024 Conference   *June, 2024*
  Presented a paper at the conference. (Grantor: IEEE Communications Society)

International Scientific Activity Incentive Award (UBED)   *October, 2023*
  Gave a tutorial talk at the IEEE BCCA 2023 Conference. (Grantor: Ankara University)

Frances Ann Frazier Student Travel Scholarship   *October, 2012*
  Awarded by the scholarship to present a paper at IEEE FIE 2012 Conference,

IEEE FIE 2012 Conference   *October, 2012*
  Presented a paper at the conference. (Grantor: Office of Research at the U. of Michigan - Flint)

Frances Ann Frazier Student Travel Scholarship   *March, 2012*
  Awarded by the scholarship to present a paper at ACM CCSC-CP 2012 Conference,

ACM SIGITE 2011 Conference   *October, 2011*
  Presented a paper at the conference. (Grantor: ACM SIGITE)

ACM SIGITE 2011 Conference   *October, 2011*
  Presented a paper at the conference. (Grantor: Office of Research at the U. of Michigan - Flint)

Frances Ann Frazier Student Travel Scholarship
  Awarded by the scholarship to present a paper at ACM SIGITE 2011 Conference,   *October, 2011*

Academic Service

Academic Journal Reviewer
IEEE Journal on Selected Areas in Communications (JSAC), ISSN: 0733-8716	*2018 - Present*
IEEE Transactions on Reliability (ToR), ISSN: 0018-9529	*2019 - Present*
IEEE Transactions on Network and Service Management (TNSM), ISSN: 1932-4537	*2020 - Present*
INFOR: Information Systems and Operational Systems, Taylor & Francis ISSN: 0315-5986	*2018 - Present*
International Journal of Communication Systems (IJCS), Wiley, ISSN: 1074-5351	*2018 - Present*
Journal of Network and Computer Applications (JNCA), Elsevier, ISSN: 1084-8045	*2018 - Present*
Turkish Journal of Electrical Engineering & Computer Sciences, TUBITAK, ISSN: 1300-0632	*2018 - Present*
International Journal of Information Security Science (IJISS), ULAKBIM, e-ISSN: 2147-0030	*2023 - Present*

TBV Journal of Computer Science and Engineering (TBV-BBMD), TBV, ISSN: 1305-8991   *2023 - Present*

Academic Journal Editorship
Associate Editor, TUBITAK Turkish Journal of Electrical Engineering & Computer Sciences
ISSN: 1300-0632   *2021 - Present*

Administrative Service

Head of the Department of Software Engineering   *March 2024 - Present*
Ankara University, Türkiye

Head of the Department of Computer Technology   *September 2019 - September 2022*
Bayburt University, Türkiye

Vice Director of Distance Education Application and Research Center   *June 2020 - September 2022*
Bayburt University, Türkiye

Public Service

Student Clubs/Organizations
Robotics and Mobile Coding Club, Bayburt University   *September 2019 - Present*
   Serving as the advisor of the club
Chess Club, University of Michigan-Flint   *May 2011 - May 2013*
   Formed and served as the president of the club
Turkish Student Association (TSA), University of Michigan-Flint   *May 2011 - May 2013*
   Served as the vice president and member of the club

Super Science Friday Event   *May 2012*
Performed a Lego MindStorm Robotic demo with S.Uludag & E.Guler, coded by me, to get K-12 students
interested in computer science.

Expertise Service   *September 2021 - Present*
Serving as an official expert in the field of computers and electronics for Consumer Arbitration Committee in
Bayburt, Türkiye

Scholarships and Awards

Academic Incentive Award 2022   *January 2022 - December 2022*
Awarded a monthly financial incentive for the fiscal year of 2022 by the Turkish National Government for academic
achievements of 2021)

Türkiye-Affiliated International Scientific Publications Incentive Program by TUBITAK   *2022*
Awarded an incentive by TUBITAK ULAKBIM within the scope of UBYT Implementation Procedures and Princi-
ples in order to increase the impact and visibility (quality) of international scientific publications from Türkiye.

M.Sc. and Ph.D. Scholarships, Türkiye   *August 2010 - December 2018*
Awarded a scholarship to study M.Sc and Ph.D. in the US by the Republic of Türkiye Ministry of National Educa-

tion,
among all the university graduates in 2010 (Only 948 of all graduates in Türkiye received the scholarship)

Assistantships

Teaching Assistant   *August 2014 - 2018*
Indiana U. - Purdue U. Indianapolis (IUPUI), Indianapolis, IN

Research Assistant   *August 2013 - August 2014*
Indiana U. - Purdue U. Indianapolis (IUPUI), Indianapolis, IN
  - An Application Delivery Platform for Mobile Apps on Global Clouds, NSF, 2012-2014
  - Secure Data Architecture: Collaborative Research: Assured Mission Delivery Network Framework for Secure
    Scientific Collaboration, NSF, 2015-2020

Graduate Student Research Assistant   *September 2012 - August 2013*
Studied in the project, titled "Wide Area Situational Awareness modeling of the Smart Grid
using Multivariate Statistical Tools", as a Research Assistant at the University of Michigan-Flint, Flint, MI

Graduate Student Research Assistant   *September 2011 - September 2012*
Studied in the project, titled "Developing Multivariate Stochastic Composite Metric for Routing
in Wireless Mesh Networks", as a Research Assistant at the University of Michigan-Flint, Flint, MI

Grader and Lab Assistant   *June 2011 - May 2013*
Worked as a Grader and a Lab Assistant for various undergraduate courses at the University of Michigan-Flint:
Telecomm & Comp Networks (Fall 2011),
Fluency w/ Info Tech & Computing (Summer 2011), Using a Unix Computer System (Winter 2012),
Prob Solving & Programming II (Summer 2012).

Professional Affiliations

ACM Member	*2018 - Present*
IEEE Member	*2018 - Present*
IEEE ComSoc Member	*2018 - Present*
IEEE Young Professionals Member	*2018 - Present*

Employment History and Experience

Teacher   *June 2009 - January 2010*
Worked as a full-time high school mathematics teacher in Isparta, Türkiye

Extra Curricular Activities

Soccer Referee   *January 2011 - December 2018*
  Served as a USSF-licensed Grade 7 level soccer referee

Soccer Player   *2002 - 2005*

Played soccer in the youth team of Tokatspor soccer club, a professional soccer club playing in 2nd league in Türkiye

References

These persons, my Ph.D. and M.Sc. advisors respectively, are familiar with my professional qualifications and character:

Dr. Arjan Durresi
Professor of Computer Science at the IUPUI.
E-mail: adurresi@iupui.edu

Dr. Suleyman Uludag
Associate Professor of Computer Science at the U of Michigan-Flint.
E-mail: uludag@umflint.edu