Alberto Dainotti

dainotti@gatech.edu
dainotti.net
AlbertoDainotti

Research Interests

Networking & Systems: Measurement-based Internet Security, Internet Measurement and Data Analysis, Global Cybersecurity Analytics, Internet & Democracy

Education

2008 **Ph.D. Computer and Systems Engineering**, *University of Napoli Federico II*, Italy
Dissertation: Understanding Internet Traffic: Can We Classify the Unknown?
Advisor: Giorgio Ventre; Co-Advisors: Antonio Pescapé, KC Claffy

2004 **M.S. Computer Engineering**, *University of Napoli Federico II*, Italy
Dissertation: Statistical characterization of HTTP traffic in Wide Area Networks
Advisor: Giorgio Ventre; Co-Advisor: Antonio Pescapé

Professional Experience

Aug. 2021–Present **Associate Professor**, *Georgia Institute of Technology, GA, USA*
School of Computer Science, College of Computing

2013–2022 **Associate Research Scientist**, *San Diego Supercomputer Center, UC San Diego*
Started as assistant research scientist; promotion to associate in July 2019 involved only a change in title but not in responsibilities. Five areas of responsibility: Strategy, Upper Management, External Outreach, Fundraising, and Research. Responsibilities include:

- Contribute to defining and evolving the group research mission in response to scientific, fiscal, and institutional contexts in and across which the group operates.
- Acting as liaison with the public and collaborating institutions, handling significant travel obligations and communicating the status and content of research to sponsors and the general public through publications and presentations.
- Supervising both research and staff personnel, postdoctoral scholars, as well as graduate/undergraduate students, and responsible for planning, organizing and implementing efforts supporting the group's research (including hiring and establishing collaborations with researchers from other institutions and industry).
- Serving as Principal Investigator for grants, developing strategies and sub-tasks that balance the government-sponsored research, educational, and industry-outreach goals of CAIDA, submitting proposals for funding to accomplish goals.
- Undertaking original Internet research, including tracking progress on problems of the Internet and how to address these problems both in technology and policy terms; co-design data-analysis infrastructure functional to our research goals.

Sep.–Dec. 2019 **Visiting Professor**, *University of Rome La Sapienza, Italy*
Hosted by the Computer Science Department at U. of Rome. Gave seminars and bootstrapped new multi-disciplinary collaborations.

2012 **Postdoctoral Scholar**, *San Diego Supercomputer Center, UC San Diego*, Mentor: KC Claffy

Led a research agenda on Internet measurements and security: detecting and analyzing Internet outages, identifying malicious botnet activies, studying network traffic captured at UCSD Network Telescope.

2010–2011 **Visiting Postdoctoral Scholar**, *Computer Science Engineering Department, UC San Diego*, Mentor: Dean Tullsen

Co-led a collaboration between Huawei, CSE@UCSD, and University of Napoli Federico II on designing and evaluating high performance packet forwarding architectures. Mentored a graduate student from Univ. Napoli visiting UCSD.

2008–2010 **Adjunct Professor**, *University of Napoli l'Orientale, Italy*

Professor of Computer Science in a graduate program. Course program included basics of analog/digital conversion and their applications to different media.

2008–2011 **Postdoctoral Scholar**, *University of Napoli Federico II, Italy*, Mentor: Giorgio Ventre

Led research on network traffic classification, packet classification, network anomaly detection, Internet measurement, and Internet security. Performed several teaching assistant tasks and served as thesis advisor both for master (16 theses) and undergraduate students (17).

2005–2008 **Researcher**, *Consorzio Interuniversitario Nazionale per l'Informatica (CINI), Italy*

Various research sub-contracts under funding from the European Union, including the ESFORS, NetQoS and OneLab research projects.

Awards

- **Best Community Artifact Award at PAM 2023** for the paper: "Improving the Inference of Sibling Autonomous Systems".
- **Best Dataset Award at PAM 2022** for the paper: "Quantifying Nations' Exposure to Traffic Observation and Selective Tampering".
- **Distinguished Paper Award at the ACM SIGCOMM Internet Measurement Conference 2019**: "Profiling BGP Serial Hijackers: Capturing Persistent Misbehavior in the Global Routing Table".
- **Applied Networking Research Prize by the Internet Research Task Force (IRTF) 2017** for the paper "BGPStream: a software framework for live and historical BGP data analysis", ACM IMC 2016.
- **Best of SIGCOMM CCR 2012** for "Extracting Benefit from Harm: Using Malware Pollution to Analyze Political and Geophysical Events", ACM SIGCOMM Computer Communication Review.
- **Applied Networking Research Prize by the Internet Research Task Force (IRTF) 2012** for the paper "Analysis of Country-wide Internet Outages Caused by Censorship", ACM IMC 2011.

Systems and Software

- **IODA — Internet Outage Detection & Analysis** — `https://ioda.inetintel.cc.gatech.edu`
  - System monitoring the Internet 24x7 in real-time to detect, visualize and characterize Internet connectivity outages significantly affecting network operators or large geographic areas.
  - Public dashboard, data exploration interfaces for registered users and RESTful API to access time-series data and alerts. Service in operation since 2016.
  - Implements several measurement and inference methods as well as a complex and distributed data ingestion, processing and presentation pipeline.
  - Funding: US NSF, US DHS, Comcast, Open Technology Fund, US State Department, ISOC
  - Users: Government Agencies and Intergovernmental Organizations (*US FCC, United Nations*

(OHCHR)), Internet Standardization and Oversight (*ISOC*), Industry (*Oracle, Thousand Eyes, Psiphon, Wikipedia)*, Organizations working in the field of human rights (*Amnesty International, Freedom House*), other research groups working in the same space (*OONI, U. Wisconsin-Madison, U. Michigan, IIJ*), ...

- **BGPStream** — `https://bgpstream.caida.org`
  - Open-source software framework for BGP streaming analytics supporting scientific research, operational monitoring, and post-event analysis.
  - v2.0 Released Nov. 2019. v1.0 Released Oct. 2015.
  - Funding: US NSF, US DHS, Cisco Systems.
  - Users: Researchers (*80+ papers on Google Scholar*), Industry and Operators (*Akamai, Amazon, Comcast, Symantec, Internet2*), Government (*US DoD*), ...
- **ARTEMIS** — `https://github.com/FORTH-ICS-INSPIRE/artemis`
  - Open-source tool for real-time detection and automatic mitigation of BGP prefix hijacking attacks. First stable release (v1.0) Dec. 2018.
  - Funding: US NSF, US DHS, Comcast, RIPE NCC.
  - Users: Internet exchange points, network operators, cloud providers (*AMS-IX, Amazon Web Services, Comcast, Century Link, Verizon, Telia, Internet2, ...*).
- **GRIP — Global Routing Intelligence Platform** — `https://grip.inetintel.cc.gatech.edu`
  - System and service for real-time monitoring and detection of suspicious Internet global routing events (including BGP hijacking attacks). Supports research, situational awareness, post-event analysis and troubleshooting.
  - Public dashboard and data inspection and visualization interfaces as well as a restful API. Service planned to be online in Spring 2021.
  - Implements several measurement and inference methods as well as a complex and parallel data-processing pipeline.
  - Funding: US NSF, US DHS, ISOC, RIPE NCC
  - Users: Researchers and industry.

Publications

Journals

PNAS'24 [J19] "Network topology facilitates internet traffic control in autocracies"
E. Keremoğlu, N. B. Weidmann, A. Gamero-Garrido, E. Carisimo, **A. Dainotti**, A. C. Snoeren
PNAS Nexus, Mar. 2024.

JITP'22 [J18] "Attack or Block? Repertoires of Digital Censorship in Autocracies"
L. Kawerau, N. Weidmann, **A. Dainotti**
Journal of Information Technology & Policy, Apr. 2022.

JOCR'19 [J17] "At Home and Abroad: The Use of Denial-of-service Attacks during Elections in Nondemocratic Regimes"
P. Lutscher, N. Weidmann, M. Roberts, M. Jonker, A. King, **A. Dainotti**
Journal of Conflict Resolution, Jul. 2019.

CCR'19 [J16] "Towards Passive Analysis of Anycast in Global Routing: Unintended Impact of Remote Peering"
R. Bian, S. Hao, H. Wang, A. Dhamdhere, **A. Dainotti**, C. Cotton
ACM SIGCOMM Computer Communication Review (CCR), Jul. 2019

TON'18 [J15] "ARTEMIS: Neutralizing BGP Hijacking within a Minute"
P. Sermpezis, V. Kotronis, P. Gigis, X. Dimitropoulos, D. Cicalese, A. King, **A. Dainotti**
IEEE/ACM Transactions on Networking, Dec. 2018

JSAC'16 [J14] "Lost in Space: Improving Inference of IPv4 Address Space Utilization"
A. Dainotti, K. Benson, A. King, B. Huffaker, E. Glatz, X. Dimitropoulos, P. Richter, A. Finamore, A. Snoeren
IEEE Journal on Selected Areas in Communications (J-SAC), Jun. 2016

TON'15 [J13] "Analysis of a "/0" Stealth Scan from a Botnet"
A. Dainotti, A. King, K. Claffy, F. Papale, A. Pescapé
IEEE/ACM Transactions on Networking, Apr. 2015

NET'14 [J12] "Traffic identification engine: an open platform for traffic classification"
W. De Donato, A. Pescapé, **A. Dainotti**
IEEE Network, Mar. 2014

TON'14 [J11] "Analysis of Country-wide Internet Outages Caused by Censorship"
A. Dainotti, C. Squarcella, E. Aben, K. C. Claffy, M. Chiesa, M. Russo, A. Pescapé
IEEE/ACM Transactions on Networking, Dec. 2014.

CCR'14 [J10] "Estimating Internet address space usage through passive measurements"
A. Dainotti, K. Benson, A. King, K. C. Claffy, M. Kallitsis, E. Glatz, X. Dimitropoulos
ACM SIGCOMM Computer Communication Review, Jan. 2014

COMP'13 [J9] "A Coordinated View of the Temporal Evolution of Large-scale Internet Events"
A. King, **A. Dainotti**, B. Huffaker, K.C. Claffy
Computing (Springer), Jan. 2013

COMNET'12 [J8] "A Tool for the Generation of Realistic Network Workload for Emerging Networking Scenarios"
A. Botta, **A. Dainotti**, A. Pescapé
Computer Networks (Elsevier), Oct. 2012
In the list of the most cited articles in Elsevier Computer Networks 2010-2016.

CCR'12 [J7] "Extracting Benefit from Harm: Using Malware Pollution to Analyze the Impact of Political Geophysical Events on the Internet"
A. Dainotti, R. Amman, E. Aben, K. Claffy
ACM SIGCOMM Computer Communication Review (CCR), Jan. 2012.
Best of SIGCOMM CCR award

NET'12 [J6] "Issues Future Directions in Traffic Classification"
A. Dainotti, K. C. Claffy, A. Pescapé
IEEE Network, Jan. 2012

COMMAG'10 [J5] "Do You Trust Your Software-based Traffic Generator?"
A. Botta, **A. Dainotti**, A. Pescapé
IEEE Communications Magazine, Sep. 2010

JOCS'09 [J4] "A Cascade Architecture for DoS Attacks Detection Based on the Wavelet Transform"
A. Dainotti, A. Pescapé, G. Ventre
Journal of Computer Security, IOS Press, Dec. 2009

COMNET'09 [J3] "Traffic Analysis of Peer-to-Peer IPTV Communities"
T. Silverston, O. Fourmaux, **A. Dainotti**, A. Botta, A. Pescapé, G. Ventre, K. Salamatian
Computer Networks, Elsevier Mar. 2009
In the list of the most cited articles in Elsevier Computer Networks 2009-2014.

COMNET'08 [J2] "Internet traffic modeling by means of Hidden Markov Models"
A. Dainotti, A. Pescapé, P. Salvo Rossi, F. Palmieri, G. Ventre
Computer Networks, Elsevier, Oct. 2008

CCPE'07 [J1] "SCTP performance evaluation over Heterogeneous Networks"
A. Dainotti, S. Loreto, A. Pescapé, G. Ventre
Concurrency Computation: Practice and Experience, Wiley, Jun. 2007

Conferences & Workshops

PAM'24 [C50] "Towards Improving Outage Detection with Multiple Probing Protocols"
M. Sethuraman, Z. Bischof, **A. Dainotti**
PAM 2024.

NSDI'24 [C49] "A System to Detect Forged-Origin BGP Hijacks"
T. Holterbach, T. Alfroy, A. Phokeer, **A. Dainotti**, C. Pelsser
USENIX NSDI 2024.

IMC'23 [C48] "How to Operate a Meta-Telescope in your Spare Time"
D. Wagner, S. Ranadive, H. Griffioen, M. Kallitsis, **A. Dainotti**, G. Smaragdakis, A. Feldmann
ACM Internet Measurement Conference (IMC) 2023.

SIGCOMM'23 [C47] "Destination Unreachable: Characterizing Internet Outages and Shutdowns"
Z. Bischof, K. Pitcher, E. Carisimo, A. Meng, R. Nunes, R. Padmanabhan, M. Roberts, A. Snoeren, **A. Dainotti**
ACM SIGCOMM 2023.

CoNEXT'23 [C46] "Aggressive Internet-Wide Scanners: Network Impact and Longitudinal Characterization"
A. Anand, M. Kallitsis, J. Sippe, **A. Dainotti**
ACM SIGCOMM Conference on Emerging Networking Experiments and Technologies (CoNEXT) 2023.

PAM'23 [C45] "Improving the Inference of Sibling Autonomous Systems"
Z. Chen, Z. Bischof, C. Testart, **A. Dainotti**
Passive and Active Measurement Conference (PAM) 2023.
PAM'23 Best Community Artifact award

IMC'22 [C44] "iGDB: Connecting the Physical and Logical Layers of the Internet"
S. Anderson, L. Salamatian, Z. Bischof, **A. Dainotti**, P. Barford
ACM SIGCOMM Internet Measurement Conference (IMC) 2022.

IMC'22 [C43] "Investigating the impact of DDoS attacks on DNS Infrastructure"
R. Sommese, K. Claffy, R. van Rijswijk-Deij, A. Chattopadhyay, **A. Dainotti**, A. Sperotto, M. Jonker
ACM SIGCOMM Internet Measurement Conference (IMC) 2022.

USENIX'23 [C42] "Access Denied: Assessing Physical Risks to Internet Access Networks"
A. Marder, Z. Zhang, R. Mok, R. Padmanabhan, B. Huffaker, M. Luckie, **A. Dainotti**, kc claffy, A. C. Snoeren, A. Schulman
USENIX Security Symposium 2023.

PAM'22 [C41] "Quantifying Nations' Exposure to Traffic Observation and Selective Tampering"
A. Gamero-Garrido, E. Carisimo, S. Hao, B. Huffaker, A. Snoeren, **A. Dainotti**
Passive and Active Measurement Conference (PAM) 2022.
PAM'22 Best Dataset award

USENIX'22 [C40] "Spoki: Unveiling a New Wave of Scanners through a Reactive Network Telescope"
R. Hiesgen, M. Nawrocki, A. King, **A. Dainotti**, T. Schmidt, M. Wählisch
USENIX Security Symposium 2022.

IMC'21 [C39] "Identifying ASes of State-owned Internet operators"
E. Carisimo, A. Gamero-Garrido, A. Snoeren, **A. Dainotti**
ACM SIGCOMM Internet Measurement Conference (IMC) 2021.

IMC'21 [C38] "The parallel lives of Autonomous Systems: ASN Allocations vs. BGP"
E. Nemmi, F. Sassi, M. La Morgia, C. Testart, A. Mei, **A. Dainotti**
ACM SIGCOMM Internet Measurement Conference (IMC) 2021.

FOCI'21 [C37] "A multi-perspective view of Internet censorship in Myanmar"
R. Padmanabhan, A. Filastó, M. Xynou, R. Sundara Raman, K. Middleton, M. Zhang, D. Madory, M. Roberts, **A. Dainotti**
ACM SIGCOMM 2021 Workshop on Free and Open Communications on the Internet (FOCI 2021).

CoNEXT'20 [C36] "DynamIPs: Analyzing address assignment practices in IPv4 and IPv6 "
R. Padmanabhan, J. P. Rula, P. Richter, S. D. Strowes, **A. Dainotti**
ACM SIGCOMM Conference on Emerging Networking Experiments and Technologies (CoNEXT) 2020, Barcelona, ES.

IMC'20 [C35] "AS-Path Prepending: there is no rose without a thorn"
P. Marcos, L. Prehn, L. Leal, **A. Dainotti**, A. Feldmann, M. Barcellos
ACM SIGCOMM Internet Measurement Conference (IMC) 2020, Pittsburgh, PA, US.

IMC'20 [C34] "MAnycast2 – Using Anycast to Measure Anycast: Challenges and Opportunities"
R. Sommese, G. Akiwate, L. Bertholdo, M. Jonker, R. van Rijswijk-Deij, **A. Dainotti**, K. Claffy, A. Sperotto
ACM SIGCOMM Internet Measurement Conference (IMC) 2020, Pittsburgh, PA, US.

PAM'20 [C33] "To Filter or not to Filter: Measuring the Benefits of Registering in the RPKI Today"
C. Testart, P. Richter, A. King, **A. Dainotti**, D. Clark
Passive and Active Measurement Conference (PAM) 2020, Eugene, OR, USA.

PAM'20 [C32] "When parents and children disagree: Diving into DNS delegation inconsistency"
R. Sommese, G. C. M. Moura, M. Jonker, R. van Rijswijk-Deij, **A. Dainotti**, KC Claffy, A. Sperotto
Passive and Active Measurement Conference (PAM) 2020, Eugene, OR, USA.

IMC'19 [C31] "Profiling BGP Serial Hijackers: Capturing Persistent Misbehavior in the Global Routing Table"
C. Testart, P. Richter, A. King, **A. Dainotti**, D. Clark
ACM SIGCOMM Internet Measurement Conference (IMC) 2019, Amsterdam, NL.
IMC'19 Distinguished paper award

TMA'19 [C30] "Geo-Locating BGP prefixes"
P. Winter, R. Padmanabhan, A. King, **A. Dainotti**
IFIP Network Traffic Measurement Analysis Conference (TMA) 2019, Paris, France.

TMA'19 [C29] "Chocolatine: Outage Detection for Internet Background Radiation"
A. Guillot, R. Fontugne, P. Winter, P. Mérindol, A. King, **A. Dainotti**, C. Pelsser
IFIP Network Traffic Measurement Analysis Conference (TMA) 2019, Paris, France.

TMA'19 [C28] "BGP hijacking classification"
S. Cho, R. Fontugne, K. Cho, **A. Dainotti**, P. Gill
IFIP Network Traffic Measurement Analysis Conference (TMA) 2019, Paris, France.

PAM'19 [C27] "How to find correlated Internet failures"
R. Padmanabhan, A. Schulman, **A. Dainotti**, D. Levin, N. Spring
Passive Active Measurement Conference (PAM) 2019, Puerto Varas, Chile.

NSDI'19 [C26] "Blink: Fast Connectivity Recovery Entirely in the Data Plane"
T. Holterbach, E. Costa Molero, M. Apostolaki, **A. Dainotti**, S. Vissicchio, L. Vanbever
USENIX NSDI 2019, Boston, MA, US.

IMC'18 [C25] "A First Joint Look at DoS Attacks BGP Blackholing in the Wild"
M. Jonker, A. Pras, **A. Dainotti**, A. Sperotto
ACM SIGCOMM Internet Measurement Conference (IMC) 2018, Boston, MA, US.

INFOCOM'18 [C24] "Inferring Carrier-Grade NAT Deployment in the Wild"
I. Livadariu, K. Benson, A. Elmokashfi, A. Dhamdhere, **A. Dainotti**
IEEE INFOCOM 2018, Honolulu, HI, US.

IMC'17 [C23] "Millions of Targets Under Attack: a Macroscopic Characterization of the DoS Ecosystem"
M. Jonker, A. King, J. Krupp, C. Rossow, **A. Dainotti**, A. Sperotto
ACM SIGCOMM Internet Measurement Conference (IMC) 2017, London, UK.

SIGCOMM'17 [C22] "SWIFT: Predictive Fast Reroute"
T. Holterbach, S. Vissicchio, **A. Dainotti**, L. Vanbever
ACM SIGCOMM 2017, August 2017, Los Angeles, CA, USA.

IMC'16 [C21] "BGPStream: a software framework for live historical BGP data analysis"
C. Orsini, A. King, D. Giordano, V. Giotsas, A. Dainotti
ACM SIGCOMM Internet Measurement Conference IMC 2016, Santa Monica, CA, US.
Awarded the IRTF Applied Network Research Prize 2017

IMC'15 [C20] "Leveraging Internet Background Radiation for Opportunistic Network Analysis"
K. Benson, **A. Dainotti**, K.C. Claffy, A. Snoeren, M. Kallitsis
ACM SIGCOMM Internet Measurement Conference IMC 2015, Tokio, JP.

TMA'15 [C19] "How Dangerous is Internet Scanning? A Measurement Study of the Aftermath of an Internet-wide Scan"
E. Raftopoulos , E. Glatz, X. Dimitropoulos, **A. Dainotti**
Traffic Monitoring Analysis Workshop (TMA 2015), Barcelona, ES.

ACSAC'14 [C18] "Uncovering Network Tarpits with Degreaser"
L. Alt, R. Beverly, **A. Dainotti**
30th Annual Computer Security Applications Conference (ACSAC), 2014, ACM, New York, NY, US.

TMA'13 [C17] "Gaining Insight into AS-level Outages through Analysis of Internet Background Radiation"
K. Benson, **A. Dainotti**, K. C. Claffy, E. Aben
Traffic Monitoring Analysis Workshop (TMA) 2013, Torino, IT.

IMC'12 [C16] "Analysis of a /0 Stealth Scan from a Botnet"
A. Dainotti, A. King, K. C. Claffy, F. Papale, A. Pescapé
ACM SIGCOMM Internet Measurement Conference IMC 2012, Boston, MA, US.
Finalist for best paper award at IMC'12.

IMC'11 [C15] "Analysis of Country-wide Internet Outages Caused by Censorship"
A. Dainotti, C. Squarcella, E. Aben, K. C. Claffy, M. Chiesa, M. Russo, A. Pescapé
ACM SIGCOMM Internet Measurement Conference IMC 2011, Berlin, DE.
Awarded the IRTF Applied Network Research Prize 2012

GLOBECOM'11 [C14] "Traffic Classification through Joint Distributions of Packet-level Statistics"
A. Dainotti, A. Pescapé, H. Kim
IEEE GLOBECOM 2011 - December 2011, Houston, TX, US.

MCS'11 [C13] "Using a Behaviour Knowledge Space Approach for Detecting Unknown IP Traffic Flows"
A. Dainotti, A. Pescapé, C. Sansone, A. Quintavalle
10th International Workshop on Multiple Classifier Systems (MCS) 2011, Lecture Notes in Computer Science, Springer - June 2011.

TMA'11 [C12] "Early Classification of Network Traffic through Multi-Classification"
A. Dainotti, A. Pescapé, Carlo Sansone
Traffic Monitoring Analysis Workshop (TMA) 2011, Vienna, AT.

INFOCOM'10 [C11] "PortLoad: taking the best of two worlds in traffic classification"
G. Aceto, **A. Dainotti**, W. de Donato, A. Pescapé
IEEE INFOCOM 2010, WIP Track, San Diego, CA, US.

ICC'10 [C10] "Identification of traffic flows hiding behind TCP port 80"
A. Dainotti, F. Gargiulo, L. Kuncheva, A. Pescapé, C. Sansone
IEEE ICC 2010, Capetown, ZA.
Awarded the "COST Strategy for Early Stage Researchers" grant.

TMA'10 [C9] "K-dimensional trees for continuous traffic classification"
V. Carela-Espanol, P. Barlet-Ros, M. Solé-Simó, **A. Dainotti**, W. De Donato, A. Pescapé,
Traffic Monitoring Analysis Workshop (TMA) 2010, Zurich, CH.

TMA'09 [C8] "TIE: a Community-Oriented Traffic Classification Platform"
A. Dainotti, W. De Donato, A. Pescapé
First international Workshop on Traffic Monitoring Analysis (TMA) 2009, Aachen, DE.

GLOBECOM'08 [C7] "Classification of Network Traffic via Packet-Level Hidden Markov Models"
A. Dainotti, W. De Donato, A. Pescapé, P. Salvo Rossi
IEEE GLOBECOM 2008, New Orleans, LA, US.

ICC'07 [C6] "Worm Traffic Analysis Characterization"
A. Dainotti, A. Pescapé, G. Ventre
IEEE ICC 2007, Glasgow, UK.

ICC'07 [C5] "Reducing Network Traffic Data Sets"
A. Botta, **A. Dainotti**, A. Pescapé, G. Ventre
IEEE ICC 2007, Glasgow, UK.

GLOBECOM'06 [C4] "Wavelet-based Detection of DoS Attacks"
A. Dainotti, A. Pescapé, G. Ventre
2006 IEEE GLOBECOM, San Francisco, CA, US.

GLOBECOM'06 [C3] "An HMM Approach to Internet Traffic Modeling"
A. Dainotti, A. Pescapé, P. Salvo Rossi, G. Iannello, F. Palmieri, G. Ventre
2006 IEEE GLOBECOM, San Francisco, CA, US.

CAMAD'06 [C2] "A Packet-level Characterization of Network Traffic"
A. Dainotti, A. Pescapé, G. Ventre
11th IEEE International Workshop on Computer-Aided Modeling, Analysis Design of Communication Links and Networks (CAMAD) 2006, Trento, Italy.

HOTP2P'05 [C1] "A packet-level Traffic Model of Starcraft"
A. Dainotti, A. Pescapé, G. Ventre
The second IEEE International Workshop on Hot Topics in Peer-to-Peer Systems (HOT-P2P) 2005, San Diego, CA, US.

Book Chapters

[B2] "Reviewing Traffic Classification"
S. Valenti, D. Rossi, **A. Dainotti**, A. Pescapé, A. Finamore, M. Mellia
"Data Traffic Monitoring and Analysis: From measurement, classification and anomaly detection to Quality of Experience", Springer (LNCS 7754), Ernst Biersack, Christian Callegari, Maja Matijasevic Eds., 2013.

[B1] "Combining Multiple Traffic Classification Techniques within a Single Platform"
G. Aceto, **A. Dainotti**, W. de Donato, F. Gargiulo, A. Pescapé, C. Sansone
RECIPE Robust and Efficient traffic Classification in IP nEtworks, Fridericiana Editrice Universitaria, pp.1-16, ISBN:978-88-833-8081-5, July 2009.

Extended Abstracts of Demos

INFOCOM'07 [D1] "Multi-protocol and multi-platform traffic generation and measurement"
A. Botta, **A. Dainotti**, A. Pescapé
INFOCOM 2007 DEMO Session, Anchorage, AK, US.**More than 200 citations**

Student Workshops & Poster Abstracts

IMC'22 [S7] "Analysis of IPv4 Address Space Utilization with ANT ISI dataset and Censys"
M. Sethuraman, Z. S. Bischof, **A. Dainotti**
ACM SIGCOMM Internet Measurement Conference (IMC) 2022 Poster Session, Nice, FR.

IMC'19 [S6] "Identifying non-spoofed traffic at Internet endpoints"
R. Hiesgen, T. Schmidt, **A. Dainotti**, A. King, M. Luckie, S. Alcock, M. Wählisch
ACM SIGCOMM Internet Measurement Conference (IMC) 2019 Poster Session, Amsterdam, NL.

ACSAC'19 [S5] "The Catch-22 Attack"
L. Shi, D. Sisodia, M. Zhang, J. Li, **A. Dainotti**, P. Reiher,
35th Annual Computer Security Applications Conference (ACSAC 2019) Poster Session, San Juan, PR.

SIGCOMM'18 [S4] "On the Potential of BGP Flowspec for DDoS Mitigation at Two Sources: ISP and IXP"
N. Hinze, M. Nawrocki, M. Jonker, **A. Dainotti**, T. C. Schmidt, M. Waehlisch,
ACM SIGCOMM 2018 Poster Session, New York, NY, US. **Marcin Nawrocki received the ACM Student Research Competition (SRC) silver medal**

CoNEXT'12 [S3] "Gaining Insight into AS-level Outages through Analysis of Internet Background Radiation"
K. Benson, **A. Dainotti**, K. C. Claffy, E. Aben
ACM Co-Next 2012 Student Workshop, Nice, FR.

CoNEXT'07 [S2] "Do You Know What You Are Generating?"
A. Dainotti, A. Botta, A. Pescapé, G. Ventre
ACM Co-Next 2007 Student Workshop, New York, NY, US.

CoNEXT'06 [S1] "Searching for Invariants in Network Games Traffic"
A. Dainotti, A. Botta, A. Pescapé, G. Ventre
ACM Co-Next 2006 Student Workshop, Lisbon, PT.

Editorials (non peer-reviewed)

CCR'20 [E4] "Lessons learned organizing the PAM 2020 virtual conference"
C. Misa, D. Guse, O. Hohlfeld, R. Durairajan, A. Sperotto, **A. Dainotti**, R. Rejaie
ACM SIGCOMM Computer Communication Review (CCR), Vol. 50, no. 3, pp.46-54, Jul. 2020.

CCR'19 [E3] "Open collaborative hyperpapers: a call to action"
A. Dainotti, R. Holz, M. Kuhlewind, A. Lutu, J. Sommers, B. Trammell
ACM SIGCOMM Computer Communication Review (CCR), Vol. 49, no. 1, pp.31-33, Jan. 2019.

CCR'18 [E2] "A Survey among Network Operators on BGP Prefix Hijacking"
P. Sermpezis, V. Kotronis, **A. Dainotti**, and X. Dimitropoulos
ACM SIGCOMM Computer Communication Review (CCR), Vol. 48, no. 1, pp.64-69, Jan. 2018.

CCR'16 [E1] "The BGP Hackathon 2016 Report"
A. Dainotti, E. Katz-Bassett, and X. Dimitropoulos
ACM SIGCOMM Computer Communication Review (CCR), Vol. 46, no. 3, Jul. 2016.

Talks

- Cybersecurity Summer Institute at Georgia Tech 2023 (**invited**): *The Internet and Political Protest in Autocracies*
- NSF Workshop on Emerging Research Opportunities at the Intersection of Statistics and Internet Measurement 2023 (**invited**): *Understanding the Spatio-Temporal Dynamics of Internet Outages*
- Cybersecurity Summer Institute at Georgia Tech 2022 (**invited**): *The Internet and Political Protest in Autocracies*
- IRTF ANRW 2018 (**invited**): *ARTEMIS: Neutralizing BGP Hijacking within a Minute*
- Internet2 TechEx'17 (**invited**): *Detecting Internet Traffic Interception based on Route Hijacking*
- TMA PhD School 2017 (**invited lecture**): *BGP measurement and live data analysis*
- NANOG 66 Lightning Talk: *48hrs after the 1st BGP Hackathon*
- NANOG 66: *BGPStream: a framework for historical analysis and real-time monitoring of BGP data*
- MPlane 2015 (**invited**): *BGPStream: historical analysis and real-time monitoring of BGP data*
- IETF 94 (**invited keynote**): *Measuring and Monitoring BGP*
- NSF workshop on Technology Transfer to Practice in Cyber Security (**invited panelist**)
- US DHS NCICC (**invited**): *IODA - Internet Outages: Detection & Analysis*
- US FCC (**invited**): *Monitoring Large-scale Internet Outages*
- US FCC Workshop on Network Resiliency (**invited**): *Lessons learned by measuring the Internet during/after the Sandy storm*
- BADGERS 2012 at CCS: *Analysis of Internet-wide Probing using Darknets*
- USENIX LISA 2012 (**invited**): *Analysis of an Internet-wide Stealth Scan from a Botnet*
- IMC 2012: *Analysis of a /0 Scan from a Botnet*
- SIGCOMM 2012: *Extracting Benefit from Harm: Using Malware Pollution to Analyze the Impact of Political and Geophysical Events on the Internet*
- IETF 84 (**invited**): *Analysis of Country-wide Internet Outages Caused by Censorship*
- IMC 2011: *Analysis of Country-wide Internet Outages Caused by Censorship*
- TMA 2011: *Early Classification of Network Traffic through Multi-Classification*
- RIPE 61: *TIE - Traffic Identification Engine*
- ICC 2010: *Identification of traffic flows hiding behind TCP port 80*
- INFOCOM 2010: *PortLoad: taking the best of two worlds in traffic classification*
- TMA 2009: *TIE: a Community-Oriented Traffic Classification Platform*
- ICC 2007: *Worm Traffic Analysis and Characterization*
- Globecom 2006: *Wavelet-based Detection of DoS Attacks*
- Globecom 2006: *An HMM Approach to Internet Traffic Modeling*
- CAMAD 2006: *A Packet-level Characterization of Network Traffic*
- HotP2P 2005: *A packet-level model of Starcraft traffic*

Other Broader Impact and Press Coverage (Selected)

- Service, dissemination towards and engagement with policy makers:
  - Contributed to the "Security of the Internet's Routing Infrastructure" report published by the Broadband Internet Technical Advisory Group (BITAG). "`https://www.bitag.org/documents/BITAG_Routing_Security.pdf`", Nov 2022
  - Provided input to the Organisation for Economic Co-operation and Development (OECD) for their report on "Routing security: BGP incidents, mitigation techniques and policy actions". "`https://www.oecd-ilibrary.org/science-and-technology/routing-security_40be69c8-en`", Oct. 2022
  - Authored a formal comment on Secure Internet Routing to the U.S. Federal Communications Commission (FCC) in response to the Commission's Notice of Inquiry, FCC 22-18. Accessible at "`https://www.fcc.gov/ecfs/document/104121647305044/1`", Apr. 2022
- Studies on Internet outages and censorship and our IODA system featured in:
  - "Ukrainian cities are suffering internet blackouts" *The Economist*, Feb. 2022
  - "The draconian rise of internet shutdowns" *WIRED UK*, Sep. 2021
  - "A Web of Impunity - The killings Iran's internet shutdown hid" *Amnesty International*, Nov. 2020
  - "Internet Shutdowns Become a Favorite Tool of Governments: 'It's Like We Suddenly Went Blind'" *The Wall Street Journal*, Feb. 2020
  - "Garbage in, info out" *Communications of the ACM*, Sep. 2012
  - "Internet Censorship Revealed Through the Haze of Malware Pollution" *ACM TechNews*, Mar. 2012
  - "Internet Junk Traffic Used to Uncover Censorship" *Tom's Guide*, Mar. 2012
  - "Internet Background Radiation Reveals Disasters and Censorship" *The Wall Street Journal*, Mar. 2012
- Study on systematic attacks to BGP routing featured in:
  - "MIT: We've created AI to detect 'serial internet address hijackers'", *ZDNet*, Oct. 2019
  - "A Machine Learning Classifier Can Spot Serial Hijackers Before They Strike", *IEEE Spectrum*, Oct. 2019
  - "Using Machine Learning to Detect IP Hijacking", *Schneier on Security*, Oct. 2019
- ARTEMIS method and tool for BGP hijacking detection featured in:
  - "Net boffins brew poison for BGP hijacks", *The Register*, Jan. 2018
  - "Open-source tool aims to curb BGP hijacking amid Chinese espionage concerns", *CyberScoop*, Dec. 2018
- DoS attacks study featured in:
  - "DoS scum attacked one-third of the 'net between 2015 and 2017" *The Register*, Nov. 2017
  - "One-third of internet pounded by DoS attacks" *ESet welivesecurity*, Nov. 2017
  - "Research Shows Rise in Global DDoS Attacks" *IBM Security Intelligence*, Nov. 2017
  - "Researchers Find One-Third of IPv4 Address Space Under Some Type of DoS Attack" *CircleID*, Nov. 2017
- Project on detecting BGP Hijacking attacks:
  - "The Expanding Cyber Threat" *Assistant Director of NSF for CISE, Jim Kurose, testified to the Subcommittee on Research and Technology for the Committee on Science, Space, and Technology, U.S. House of Representatives. While discussing NSF's portfolio of cyber security research, he chose five "examples of the kinds of foundational research projects that small teams of researchers are pursuing, and their intended broader significance".*, Jan. 2015
- Study identifying a global botnet stealth scan featured in:
  - "Saliently Sality Botnet Trapped Scanning IPv4 Address Space" *SpamFighter*, Oct. 2012

- "Botnet maps the entire internet" *The H Security*, Oct. 2012
- "Botnet Spotted Silently Scanning IPv4 Address Space For Vulnerable VoIP" *Dark Reading*, Oct. 2012

Grants

Approximately $10M as PI plus $5.5M as Co-PI

2024–2027 **$1,200,000 from NSF**, *Role: PI*
2419826 CICI: TCR: Making Network Telescopes Dynamically Adaptable Through Network Programmability

2024–2025 **$960,000 from Open Technology Fund**, *Role: PI*
IODA: An Observatory for Realtime Monitoring and Analysis of Internet Blackouts Caused by Censorship

2023–2024 **$1,200,000 from US Department of State**, *Role: PI*
Improving IODA's capabilities

2022 **$253,297 from Open Technology Fund**, *Role: PI*
An Observatory for Realtime Monitoring and Analysis of Internet Blackouts Caused by Censorship

2020–2023 **$845,087 from US Department of State**, *Role: PI*
Improving IODA's capabilities to monitor Internet connectivity shutdowns

2020–2021 **$95,000 from RIPE NCC Community Projects Fund**, *Role: PI*
GRIP / BGP Hijacking Observatory

2020–2021 **$100,000 from Internet Society (ISOC)**, *Role: PI*
GRIP / BGP Hijacking Observatory

2020–2021 **$100,000 from Internet Society (ISOC)**, *Role: PI*
IODA: Internet Outage Detection and Analysis

2019–2020 **$291,725 from Open Technology Fund**, *Role: PI*
An Observatory for Realtime Monitoring and Analysis of Internet Blackouts Caused by Censorship

2018–2020 **$1,000,000 from US DHS**, *Role: PI*
IODA-NP: Multi-source Realtime Detection of Macroscopic Internet Connectivity Disruption

2018–2019 **$203,390 from Open Technology Fund**, *Role: PI*
An Observatory for Realtime Monitoring and Analysis of Internet Blackouts Caused by Censorship

2018–2019 **$184,985 from NSF, OAC-1848641**, *Role: PI*
EAGER:Experimental Deployment of the ARTEMIS BGP Hijacking Detection Prototype in Research and Educational Networks

2019–2019 **$100,000 from Comcast Innovation Fund**, *Role: PI*
ARTEMIS: Neutralizing BGP Hijacking within a Minute

2018–2020 **$1,500,000 from US DHS**, *Role: Co-PI*
Advancing Scientific Study of Internet Security and Topological Stability (ASSISTS)

2017–2020 **$732,459 from NSF, CNS-1730661**, *Role: PI*
CI-SUSTAIN: Sustainable Tools for Analysis and Research on Darknet Unsolicited Traffic (STARDUST)

2017–2022 **$1,058,666 from NSF, 1705024**, *Role: Lead PI of multi-institutional project*
SaTC: Large: Investigating the Susceptibility of the Internet Topology to Country-level Connectivity Disruption and Manipulation

2017–2020 **$4,000,000 from NSF, 1724853**, *Role: Co-PI*
CIF21 DIBBs: EI: Integrated Platform for Applied Network Data Analysis (PANDA)

2016–2017 **$95,000 from Cisco Systems**, *Role: PI*
Native Support for the BGP Monitoring Protocol in BGPStream

2014–2019 **$587,433 from NSF, CNS-1423659**, *Role: Lead PI of multi-institutional project*
TWC: TTP Option: Small: Collaborative: Detecting and Characterizing Internet Traffic Interception Based on BGP Hijacking

2013–2014 **$119,900 from Comcast Tech Fund**, *Role: PI*
Monitoring and Visualizing Internet Outages

2012–2016 **$1,467,103 from NSF, CNS-1228994**, *Role: PI*
TTP: Medium: Detection and Analysis of Large-Scale Internet Infrastructure Outages

Service

- **Program Chair:** IMC 2025, PAM 2020, TMA 2014, Big-DAMA 2018, 2017
- **Steering committee member:** TMA Conference 2017-2018, TMA Workshop 2014-2016
- **Editorial board member:** IEEE/ACM Transactions on Networking (2017-2020), ACM SIGCOMM Computer Communication Review (2015-2018)
- **Guest editor:** International Journal of Network Management, Wiley (2015)
- **General Chair:** ACM CoNEXT 2018
- **Organizer:** EECS Rising Stars 2023, MapKIT Workshop 2022, BGP Hackathon 2016, CAIDA IMAPS 2018, 2017, 2016, 2014, CAIDA DUST 2021, 2019, TMA International PhD School 2011
- **Program committee member:**
  - **2024:** IMC, SIGCOMM
  - **2023:** IMC, ACSAC
  - **2022:** IMC
  - **2020:** IMC, PAM
  - **2019:** IMC, PAM, TMA
  - **2018:** PAM, TMA, Global Internet Symposium
  - **2017:** CoNEXT, ICC, PAM, TMA
  - **2016:** ICC, TMA
  - **2015:** PAM, ICC, GLOBECOM, TMA
  - **2014:** PAM, ICC, GLOBECOM
  - **2013:** IMC, TMA, GLOBECOM, ICNC, WNM
  - **2012:** GLOBECOM, TMA
- **Other organizing committee roles:** Travel Grant Co-Chair IMC 2023; Ethics Committee IMC 2023; Poster Session Co-Chair IMC 2022
- **Reviewer for funding agencies:** NSF (2015-2018, 2021-2023); European Commission Horizon 2020 Programme, 7th Framework Programme (2011-2014).

Mentoring

2013–present **Postdoctoral Mentor**

- Amanda Meng, Research Scientist, Georgia Tech (2021-present)
- Zachary Bischof, Research Scientist, Georgia Tech (2021-present)
- Thomas Holterbach, PostDoc, Georgia Tech (Fall 2022)
- Ramakrishna Padmanabhan, PostDoc, UC San Diego (2019-2021)
- Mingwei Zhang, Internet Data Scientist, UC San Diego (2018-2021)
- Shuai Hao, PostDoc, UC San Diego (2018-2019)
- Philipp Winter, Internet Data Scientist, UC San Diego (2018-2019)
- Chiara Orsini, PostDoc, UC San Diego (2013-2016)

2016–present **PhD Advisor and PhD defense doctoral committees**

- Olivier Bemba, PhD advisor, SCP at Georgia Tech (2024-Present)
- Zahra Yazdani, PhD advisor, SCS at Georgia Tech (2023-Present)
- Feng Zhu, PhD advisor, SCS at Georgia Tech (2023-Present)
- Weili Wu, PhD advisor, SCS at Georgia Tech (2023-Present)
- Iliana Xygkou, PhD advisor, SCS at Georgia Tech (2022-Present)
- Zhiyi Chen, PhD advisor, SCS at Georgia Tech (2021-Present)
- Kennedy Middleton, PhD committee, Political Science Department at UC San Diego (2019-Present)
- Alexander Gamero-Garrido, PhD co-advisor, CSE Department at UC San Diego (2019-2021)
- Pedro Botelho Marcos PhD thesis defense committee (Sep. 2019), Universidade Federal Do Rio Grande Do Sul, Brazil
- Danilo Cicalese PhD thesis defense committee (May 2018), University Telecom Paris Tech, FR
- Karyn Benson PhD thesis defense committee (Jun. 2016), CSE Department at UC San Diego

2013–present **Master students: advisor for master thesis / graduation project / research internship**

- Sahil Ashish Ranadive, SCS Georgia Tech. Role: Advisor Master Project (Spring 2024)
- Aniket Anand, SCS Georgia Tech. Role: Advisor Master Project (Spring 2023)
- Berkay Barlas, SCS Georgia Tech. Role: Advisor Master Project (Spring 2023)
- Aviva Smith, SCS Georgia Tech. Role: Advisor Master Project (Spring 2022)
- Ojas Gupta, CSE Department UC San Diego. Role: thesis adviser and committee (Fall 2017, Spring 2018)
- Jae Hyun Park, CSE Department UC San Diego. Role: thesis adviser and committee (Fall 2017, Spring 2017)
- Induja Sreekanthan, CSE Department UC San Diego. Role: research adviser (Spring 2017)
- Lenord Melvix, CSE Department UC San Diego. Role: research adviser (Spring 2016)
- Deepak Arulkannan, CSE Department UC San Diego. Role: adviser for graduation project (Spring 2013)

2015–2019 **Research-Internship Advisor of visiting PhD students**, UC San Diego

- Elverton Fazzion, Universidade Federal de Minas Gerais, BR (Jul-Sep 2019)
- Lumin Shi, University of Oregon, US (Jun-Sep 2019)
- Raphael Hiesgen, Hamburg University of Applied Sciences, DE (Oct 2018 - Mar 2019)
- Shinyoung Cho, University of Massachusetts Amherst, US (Feb-Mar 2018, Nov-Jan 2019)
- Mattijs Jonker, University of Twente, NL (Mar-Aug 2017, Feb-Apr 2018)
- Anant Shah, Colorado State University, US (Oct-Dec 2017)
- Danilo Cicalese, Telecom ParisTech, FR (Sep 2016 - Feb 2017)
- Thomas Holterbach, ETH Zurich, CH (Jul-Dec 2016)
- Danilo Giordano, Politecnico di Torino, IT (Jan-Jul 2016)
- Adriano Faggiani, University of Pisa, IT (Feb-July 2015)
- Ruwaifa Anwar, Stony Brook University, US (Jun-Jul 2015)

2005–2012 **Master's and bachelor's thesis advisor**, University of Napoli Federico II, Italy
Served as thesis advisor and co-advisor for more than **30 theses** in computer and telecommunication engineering.

Teaching

Fall 2022, 2023, 2024 **Associate Professor**, *CS6250/CS4251 Computer Networks/Computer Networking II*, College of Computing, Georgia Tech

Spring 2022, 2023, 2024 **Associate Professor**, *CS8803-IDS Internet Data Science*, College of Computing, Georgia Tech

2008–2010 **Adjunct Professor**, *Computer Science*, University of Napoli l'Orientale, Italy

2008–2011 **Co-Lead**, *Computer Networks II*, School of Engineering, University of Napoli Federico II, Italy

2008–2011 **Co-Lead**, *Computer Networks I*, School of Engineering, University of Napoli Federico II, Italy

2008–2011 **Co-Lead**, *Computer Architecture*, School of Engineering, University of Napoli Federico II, Italy

2007–2008 **Teaching Assistant**, *Computer Science*, University of Napoli Suor Orsola Benincasa, Italy

2007–2009 **Teaching Assistant**, *Logic Circuits*, School of Engineering, University of Napoli Federico II, Italy

2005–2010 **Teaching Assistant**, *Computer Science and Multimedia*, University of Napoli Suor Orsola Benincasa, Italy

2004–2008 **Teaching Assistant**, *Computer Science*, University of Napoli L'orientale, Italy

2006–2007 **Teaching Assistant**, *Databases*, School of Engineering, University of Napoli Federico II, Italy