

Family name, First name: Quinlan, Jason J.

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Date of birth: 11<sup>th</sup> of August 1971

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Jason is the part-time coordinator and Senior Tutor in CSIT SOLAS, which is the School of Computer Science and Information Technology Student Online Learning And Support Hub. His role is the development of support and learning for all first year Computer Science students in UCC. He is also a full-time Lecturer in the Computer Science Department and teaches first and second year undergraduate students with Introduction to Programming and Problem Solving.

Across a range of years, he taught first year CS students, focused primarily on "CS1117 - an introduction to programming" and third year students in "CS3305 - Team Software Project". Prior to this he was a Senior Post-Doc Researcher focusing on Intelligent Video Delivery at the Edge for 5G networks. He holds a PhD in computer science. In academia he has extensive experience in student mentoring, lecturing, funding applications and project supervision. Jason has a wealth of technical and transferable skills, and continues to expand these through personal development certification in teaching and learning, as well as project management.

## EDUCATION

2022	Professional Diploma in Leadership – Irish Management Institute (IMI) UCC
2021	Postgraduate Certificate in Project Management - PCPJM UCC Professional Scrum Master I – Scrum.org PRINCE2 Practitioner CPD in Project Management - Axelos
2020	Postgraduate Certificate in Higher Level Teaching and Learning - CKB02 UCC PMI Certified Associate in Project Management - PMI-CAMP PRINCE2 Foundation CPD in Project Management - Axelos
2015	PhD Graduation on the <b>26<sup>th</sup> of February 2015</b> Department of Computer Science, University College Cork, Ireland <u>Prof. Cormac Sreenan</u> (Supervisor)
2010	Computer Science BSc (Hons) Department of Computer Science, University College Cork, Ireland

## CURRENT POSITION

9/2021 – current	Lecturer (Full-time Fixed-term): Department of Computer Science, University College Cork, Ireland
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## PREVIOUS LECTURING POSITIONS

9/2020 – 9/2021	Coordinator and Senior Tutor (Part-time Hourly-paid): Student Online Learning And Support Hub for the School of Computer Science and Information Technology (CSIT SOLAS) Department of Computer Science, University College Cork, Ireland
1/2021 – 3/2021	Lecturer (Part-time Hourly-paid): Department of Computer Science, University College Cork, Ireland

9/2019 – 5/2020 Lecturer (Full-time Fixed-term):  
Department of Computer Science, University College Cork, Ireland

#### RESEARCH POSITIONS

6/2020 – 8/2020 Senior Post-Doc Research:  
CONNECT  
Department of Computer Science, University College Cork, Ireland

9/2017 – 8/2019 Senior Post-Doc Research:  
SFI iVID Project for Intelligent Video Streaming  
Department of Computer Science, University College Cork, Ireland

8/2014 – 11/2016 Post-Doc Research:  
SFI iVID Project for Intelligent Video Streaming  
Department of Computer Science, University College Cork, Ireland

#### SUPERVISION OF GRADUATE STUDENTS AND POSTDOCTORAL STAFF

2010 – 2021 1 Postdoc/ 2 Graduated PhD/ 14 Graduated Master Students/ 13 Graduated Undergraduate/ 38 Summer Interns  
Department of Computer Science, University College Cork, Ireland

#### RECENT LECTURING ACTIVITIES

2021 – 2022 Problem-Solving (CS1022/CS5222), University College Cork, Ireland

2021 – 2021 Introduction to Programming (CS1117), University College Cork, Ireland

2021 – 2021 Team Software Project (CS3305), University College Cork, Ireland

2019 – 2020 Introduction to Programming (CS1117), University College Cork, Ireland

2018 – 2019 Summer Review – Lectures and Tutorials:  
Introduction to Programming (CS1117), University College Cork, Ireland  
System Organization II (CS1111), University College Cork, Ireland

2018 – 2019 Workplace Technology and Skills (CS3306), University College Cork, Ireland

2017 – 2018 Summer Review – Lectures and Tutorials:  
System Organization I (CS1110), University College Cork, Ireland  
System Organization II (CS1111), University College Cork, Ireland

#### REFEREEING (TPC MEMBER, EXTERNAL REVIEWER AND JOURNAL ROLES)

##### 2022:

- TPC Member: Conference on Network Softwarization (NetSoft) Virtual

##### 2021:

- TPC Member: Conference on Network Softwarization (NetSoft) Virtual

##### 2020:

- Athlone Institute of Technology External MSc reviewer
- Demo Session Chair – IEEE International Symposium On A World Of Wireless, Mobile And Multimedia Networks (WoWMoM) Cork, Ireland
- TPC Member: IEEE International Symposium On A World Of Wireless, Mobile And Multimedia Networks (WoWMoM) Cork, Ireland
- TPC Member: Conference on Network Softwarization (NetSoft) Ghent, Belgium
- TPC Member: Multimedia Systems Conference (MMSys) Istanbul, Turkey

##### 2019:

- Session Chair: “Real-Time Video at the Edge” – ACM Multimedia Systems Conference (MMSys) Amherst, MA, USA – accepted proposal

- TPC Member: IEEE Wireless Communications and Networking Conference (WCNC) Marrakech, Morocco - invited by Prof. Tarik Taleb
- TPC Member: Conference on Network Softwarization (NetSoft) Paris, France - invited by Prof. Esposito
- Packet Video Workshop (PV) Amsterdam, Netherlands– invited by Dr. Zhi Li
- Multimedia Systems Conference (MMSys) Amsterdam, Netherlands - invited by Dr. Ali C. Begen

As well as numerous technical reviews of papers, in journals such as *Multimedia Systems Journal (MMSJ)*, *Transactions on Multimedia Computing, Communications, and Applications (TOMM)* and *IEEE Transactions on Multimedia*.

## PRIMARY RESEARCH INTERESTS

Multimedia Networking and Systems (DASH, SAND), In-network optimisation for content delivery (Mobile Edge, Cooperative Users) and Network simulation (Hybrid Physical and Simulated Infrastructure), 5G optimised delivery

## AREAS OF COMPETENCE

Industry: Customer retention and growth, Solutions for business organisational structure and employee relations, Defined practices by which the company complied with Electrical and Health & Safety standards

Academia: Mobile Edge, Cellular networks, Design and implementation of Real-time network emulation/simulation, Video Analysis and Delivery models

## ACADEMIC COLLABORATION:

- Prof. K. K. Ramakrishnan, Dept. of Computer Science and Engineering, University of California, Riverside, USA: On the SFI iVID project, I have worked with Prof. Ramakrishnan, on a range of topics which include: software-based networks, video adaptation algorithms, and multimedia distribution networks.
- Prof. C. Rothenberg, Department of Computer Engineering and Industrial Automation, School of Electrical and Computer Engineering, University of Campinas, Brazil. Recent Collaboration with Prof. Rothenberg and one of his PhD students, R. Ul Mustafa, resulted in two conference papers in 2020. This work focuses on adaptive HAS video and metrics for machine learning at the Edge.
- Dr. D. Raca, Faculty of Electrical Engineering University of Sarajevo, Bosnia and Herzegovina. I have worked closely with Darijo since he was a PhD on the iVID project in UCC. We continue to collaborate across a range of areas, including our headless DASH player (godash) and evaluation testbed (godashbed), our continued modelling of cellular network trace data, and machine/deep learning at the cellular edge.

## INDUSTRY COLLABORATION:

- **AT&T (US):** I gained access to the knowledge base of a large US-based network operator while providing them with heuristic protocols and algorithms for client-side adaptation of video content as evaluated in the iVID testbed.
- **Dell EMC:** I obtained access to their cloud hierarchy for computationally complex calculations for video quality metrics and provided technical advice on software defined control characteristics in their partitioned network.

#### PUBLICATIONS: PEER REVIEWED JOURNALS

- Y. Sani, J.J. Quinlan, C.J. Sreenan (2022). A Bio-inspired Managed Video Delivery Service using HTTP-based Adaptive Streaming Multimedia Systems. *ACM/Springer Multimedia Systems Journal*, Jan. 2022
- Jason J. Quinlan, Ahmed H. Zahran, K. K. Ramakrishnan and Cormac J. Sreenan. (2018) 'ASAP: Adaptive Stall-Aware Pacing for Improved DASH Video Experience in Cellular Networks'. *ACM Transactions on Multimedia Computing, Communications and Applications (TOMM)*
- Jason J. Quinlan, Ahmed H. Zahran and Cormac J. Sreenan. (2018) 'Efficient Delivery of Scalable Video Using a Streaming Class Model'. **(Invited)** *Information MPDI*
- Jason J. Quinlan, Ahmed H. Zahran and Cormac J. Sreenan (2015) 'ALD: Adaptive Layer Distribution for Scalable Video'. *ACM/Springer Multimedia Systems Journal*

#### PUBLICATIONS: CONFERENCE PROCEEDINGS

- K. Hodzic, M. Cosovic, S. Mrdovic, J. J. Quinlan and D. Raca (2022) 'Realistic video sequences for subjective QoE analysis', 13th ACM Multimedia Systems Conference (MMSys'22), Athlone, Ireland, 14 – 17 June
- R. Ul Mustafa, M.T. Islam, C.E. Rothenberg, S.Ferlin, D. Raca, and J.J. Quinlan. 2020. DASH QoE Performance Evaluation Framework with 5G Datasets. In 2nd International Workshop on Analytics for Service and Application Management (AnServApp 2020) @ CNSM 2020, November 2020, Izmir, Turkey
- R. Ul Mustafa, S. Ferlin, C. Esteve Rothenberg, D. Raca, and J.J. Quinlan. 2020. A Supervised Machine Learning Approach for DASH Video QoE Prediction in 5G Networks. In 16th ACM Symposium on QoS and Security for Wireless and Mobile Networks (Q2SWinet'20), November 16–20, 2020, Alicante, Spain
- J. O'Sullivan, D. Raca, and J.J. Quinlan. Demo: godash 2.0 - The Next Evolution of HAS Evaluation. 21<sup>st</sup> IEEE International Symposium On A World Of Wireless, Mobile And Multimedia Networks (IEEE WoWMoM 2020), Cork, Ireland. 31<sup>st</sup> August - 3<sup>rd</sup> September, 2020
- D. Raca, D. Leahy, C.J. Sreenan and Jason J. Quinlan (2020) Beyond Throughput: The Next Generation a 5G Dataset with Channel and Context Metrics. *ACM Multimedia Systems Conference (MMSys)*, Istanbul, Turkey
- D. Raca, M. Manificier, and J.J. Quinlan. goDASH - GO accelerated HAS framework for rapid prototyping. 12th International Conference on Quality of Multimedia Experience (QoMEX), Athlone, Ireland. 26th to 28th May, 2020
- Y. Sani, D. Raca, Jason J. Quinlan and C.J. Sreenan (2020) SMASH: a Supervised Machine Learning Approach to Adaptive Video Streaming over HTTP. 12th International Conference on Quality of Multimedia Experience (QoMEX), Athlone, Ireland
- Jason J. Quinlan, K.K. Ramakrishnan and C.J. Sreenan (2019) DISGUISE: A highly dynamic

framework for real-time simulated 5G evaluation *IEEE International Symposium on Local and Metropolitan Area Networks (LANMAN)*

- Jason J. Quinlan, Utz Roedig (2019) The benefits of Deceit: a Malicious client in a 5G Cellular Network *IEEE International Symposium on Local and Metropolitan Area Networks (LANMAN)*
- D. Raca, Y. Sani, C.J. Sreenan and Jason J. Quinlan (2019) DASHbed: a testbed Framework for Large Scale Empirical Evaluation of Real-Time DASH in Wireless Scenarios *Multimedia Systems (MMSys'18)*
- Jason J. Quinlan and C.J. Sreenan (2018) Multi-Profile Ultra High Definition (UHD) AVC and HEVC 4K DASH Datasets *PROCEEDINGS OF THE 9TH ACM MULTIMEDIA SYSTEMS CONFERENCE (MMSys'18)*
- D. Raca, Jason J. Quinlan, Zahran, AH; and C.J. Sreenan (2018) Beyond Throughput: a 4G LTE Dataset with Channel and Context Metrics. *Proceedings of the 9th ACM on Multimedia Systems Conference, MMSys 2018*
- Jason J. Quinlan. Software Defined adaptive Networking - IoT and beyond. Proceedings published by the ACM, *MadCom Workshop: New Wireless Communication Paradigms for the Internet of Things @ the ACM International Conference on Embedded Wireless Systems and Networks (EWSN) 2018*
- Khalid, A; Jason J. Quinlan and C.J. Sreenan (2017) MiniNAM: A network animator for visualizing real-time packet flows in Mininet *20th conference on Innovations in Clouds, Internet and Networks (ICIN2017)*
- Ahmed H. Zahran and Jason J. Quinlan and K. K. Ramakrishnan and Cormac J. Sreenan (2017) SAP: Stall-Aware Pacing for Improved DASH Video Experience in Cellular Networks. *Proceedings of the 8th ACM on Multimedia Systems Conference, MMSys 2017 (Winner of the "Excellence in DASH Award")*
- Ahmed H. Zahran and Jason J. Quinlan and K. K. Ramakrishnan and Cormac J. Sreenan (2016) Impact of the LTE scheduler on achieving good QoE for DASH video streaming *IEEE International Symposium on Local and Metropolitan Area Networks, LANMAN 2016, Rome, Italy, June 13-15, 2016* , pp.1-7
- Jason J. Quinlan, Reviakin, A; Khalid, A; Ramakrishnan, K.K and C.J. Sreenan (2016) DEMO: D-LiTE-ful: an evaluation platform for DASH QoE for SDN-enabled ISP offloading in LTE *10th ACM International Workshop on Wireless Network Testbeds, Experimental evaluation & CHaracterization (WINTECH) at the ACM MobiCom Conference*
- Jason J. Quinlan, Ahmed H. Zahran and Cormac J. Sreenan (2016) Datasets for AVC (H.264) and HEVC (H.265) evaluation of dynamic adaptive streaming over HTTP (DASH). *7th International Conference on Multimedia Systems (MMSYS 2016)*
- Ahmed H. Zahran, Jason J. Quinlan, Raca, D, Cormac J. Sreenan; Halepovic, E; Sinha, R. K; Jana, R; Gopalakrishnan, V (2016) OSCAR: An Optimized Stall-Cautious Adaptive Bitrate Streaming Algorithm For Mobile Networks *8th ACM Workshop on Mobile Video (MoVid 2016)*
- Jason J. Quinlan and Darijo Raca and Ahmed H. Zahran and Ahmed Khalid and K. K. Ramakrishnan and Cormac J. Sreenan (2016) D-LiTE: A platform for evaluating DASH performance over a simulated LTE network *IEEE International Symposium on Local and Metropolitan Area Networks, LANMAN 2016 (Best Demo Award)*
- Jason J. Quinlan, Ahmed H. Zahran, K. K. Ramakrishnan and Cormac J. Sreenan (2015) Delivery of adaptive bit rate video: balancing fairness, efficiency and quality *2015 IEEE International Workshop on Local and Metropolitan Area Networks, LANMAN 2015*
- Jason J. Quinlan, Ahmed H. Zahran and Cormac J. Sreenan (2013) ALD: adaptive layer distribution for scalable video . In: Carsten Griwodz eds. *Multimedia Systems Conference 2013, MMSys '13, Oslo, Norway, February 27 - March 01, 2013*

- Jason J. Quinlan, Ahmed H. Zahran and Cormac J. Sreenan (2012) SDC: Scalable description coding for adaptive streaming media *19th International Packet Video Workshop, PV 2012, Munich-Garching, Germany, May 10-11, 2012*
- Jason J. Quinlan, Ahmed H. Zahran and Cormac J. Sreenan (2012) CMSE: A Network Element for Assistive Media Steaming *Proc. of 11th Information Technology and Telecommunication Conference (IT&T)*

## RESEARCH INTERESTS

My current research interests are in:

- Multimedia Networking and Systems (Adaptive Video delivery, Layered Video, Quality of Experience, Quality of Service, network protocols)
- In-network optimisation for content delivery (Mobile Edge, middle-boxes, last hop wireless optimisation)
- Simulation models and protocols for 5G delivery of geo-dependent video content (concerts, AR/VR)
- Image processing with reference to AR/VR
- Enhancing the interaction of Assistive virtual assistant technology, such as the Alexa AI
- Software Defined Systems (networking, NFV, traffic engineering, storage)
- Scalable Video (SVC, MDC and similar variants)

## TEACHING INTERESTS & ABILITIES

My **objectives in teaching** are simply to offer the course material in such a manner to evoke interest in the students, whether this is through online course material, interactive video sessions, labs, tutorials, online or paper submissions, or simply explaining the content in a slow and methodical manner. The teaching objectives of the underlying content will ultimately depend on the module being presented. While also offering a level of lab/tutorials that mandates all students find something that not only interests them intellectually but also offers them a means of maximising their 'continuous assessment' marks. I have been supervising Undergraduate and MSc students for over 10 years and I have found that support and guidance is much more beneficial to the students than direction instructions.

### SUPERVISION:

Over the course of the ten years of my Post-Doc & Lecture appointments, I have been principal supervisor or co-supervised 15 MSc students, 19 Undergraduate FY projects, and numerous interns, as well as the 3 PhD students and 1 Post-Doc researcher in the iVID project.

My supervision has covered areas close to my research area (scalable video, video QoE, Resource allocation in a simulated LTE network, an SDN CDN), as well as areas outside my core research (localisation RSSI-fingerprinting, machine learning for multi-distribution 5G traces, ubiquitous health in mobile smart watches, (de)blurring image processing, games development). Each project offered areas of personal growth, as well as a means to communicate ideas and concepts which inspire the students.

## PROFESSIONAL DEVELOPMENT:

- Graduated in the "Postgraduate Certificate in Project Management" module (PCPJM) in UCC
- Certified as a PRINCE2 Practitioner
- Certified as a PMI Certified Associated – PMI-CAPM
- Certified as a Professional Scrum Master – PSM I
- Graduated in the "IMI Prof Diploma in Leadership" from the Irish Management Institute (IMI)

## RECENT OUTREACH ACTIVITIES:

- The MISL Summer of Code is a personal outreach initiative in which students from local secondary schools and third level institutions (foreign and domestic) intern in UCC during the summer recess. The goal of the initiative is to provide the students with access to a research lead project, in which they enhance their programming, logistical and development skills. Over the past four years, I have supervised in excess of 30 students across a range of areas such as Alexa interactions, Network Simulation, 5G networking, Security, DASH adaptive video player, image processing, gaming, AR/VR, facial recognition, web scrapping, and machine/deep learning.
- Through an Enterprise Ireland Innovation Voucher (which permits a company to explore a business opportunity or problem with a registered knowledge provider), I assisted a local company, WhatSalon, to develop a *Natural Language* Processing toolkit which can be added as a supporting layer to their existing software suite. WhatSalon is a mobile platform for booking beauty appointments.

## AWARDS WON:

- In my initial Post-PhD position, my role was primarily system based, with specific reference to the "Architecture and framework for iVID evaluation of adaptive video streaming". The primary focus of my work was to create a novel hybrid physical and simulated infrastructure in which actual adaptive video clips are streaming from a network server to clients over a simulated air-interface in real-time, 4G/LTE was utilised as the last-hop and key bottleneck, as described to us by one of our key iVID collaborators: AT&T (US). This framework allows for the evaluation of real-time video streaming from multiple physical devices over a 4G/LTE simulated network, and it gives the iVID UCC team a unique advantage in evaluating time-sensitive algorithms and protocols. The implementation of testbed required me to solve significant challenges such as real-time traffic management in the Network Simulator NS-3, API integration in the video players, and in-network optimisation models for resource allocation. The testbed framework has been released to the greater community and continues to be used by academic researchers in other institutes in such locations as Italy and the US. A portable model won "**Best Demo**" at the long-established forum for peer-reviewed publications in networking: IEEE International Symposium on Local and Metropolitan Area Networks (*LANMAN*) 2016. The testbed was extended to provide optimization of control and data planes as provided by Software Defined Networking (SDN), and a demonstration model was presented at ACM MobiCom 2016. I am currently extending the air-interface with 5G mmwave technology for 4K UHD video streaming capabilities.
- My work on a Stall Aware in-network protocol (SAP) that provides a "DASH video traffic management solution that reduces playback stalls" won the "**Excellence in DASH Award**" at the highly competitive top peer-reviewed conference in the field of media: ACM Multimedia Systems (MMSys) 2017. My role was system orchestration: with control and management of the stream flows over the backhaul network and leveraging both physical elements and

network simulation for real-time streaming of video content in a controlled emulated environment.

#### PENDING AND GRANTED PATENTS:

- During my PhD studies, my research in scalable video optimisation was utilised as a patent PCT application “Method and System for Scalable Description Coding for Adaptive Streaming of Data, patent number P10900PC, Inventors: J. Quinlan, A. Zahran, C. Sreenan”
- Currently my work on the design and evaluation of a stall-cautious algorithm for adaptive video delivery is under review for patent application “OSCAR-H: An optimized Stall-Cautious Adaptive Bitrate Streaming Heuristic for Mobile Networks, Inventors: A. Zahran, C. Sreenan, J. Quinlan, D. Raca (UCC), and E. Halepovic, RK Sinha, R Jana, V Gopalakrishnan (AT&T US)”

#### KEY ACHIEVEMENTS:

- My proposal for viewing real-time packet flow in the network emulator “Mininet” culminated in the paper “MiniNAM: A Network Animator for Visualizing Real-Time Packet Flows in Mininet” at the competitive per-reviewed ICIN Conference on Innovations in Clouds, Internet and Networks (ICIN) 2017 and is currently being used in the undergraduate lab “CS3506 Networks and Data Communications” in University College Cork (UCC) and at University of California, Riverside (UCR), as well as by industry researchers, such as Huawei. Mininet is written in Python, which mandated a deep understanding of the concepts, principles, function calls, syntax and structure of the language.

#### FUNDING:

- In 2018, I applied for both an SFI Starting Investigators Research Grant (SIRG), and an ERC Starting Grant (StG), and while both were unsuccessful, I did benefit from budget preparation / justification, risk assessment, as well Impact statement design. All of which I can use when I re-apply for both of these funds in 2021/2.
- In 2018, I received an Enterprise Ireland ERC StG grant of € 15,224.00 to support my application to ERC.

#### CAREER BREAKS

##### December 2016 to Mid-September 2017:

After having spent 10 years working two full time jobs (managerial responsibilities in my electrical contracting firm “Quinlan Development” and my academic studies in “University College Cork”), and upon completion of my initial two-year Post-Doctoral Researcher position in the iVID project, I took 9 months off to spend time with my family and focus on my electrical company. During this time, I continued to assist the iVID project (finalising the SAP work), and also contributed via reviews for “KSII Transactions on Internet and Information Systems”, “Transactions on Mobile Computing” and TPC duties on “ICNC 2018”.

#### REFERENCES:

References on request