VARUN SINGH

ESPOO   +358-443450105;   varun.singh-at-gmail.com   http://www.netlab.tkk.fi/~varun

Education

- **Aalto University, School of Electrical Engineering**—Espoo, FI
  Major: Networking Technology. Minor: in Networking Economics, 2011–2014

  - Funded by "Future Internet Graduate School" (May 2011–Dec 2013).
  - **PhD. Title**: *"Protocols and Algorithms for Adaptive Multimedia Applications"*
  - **Advisor**: Prof. Jörg Ott
  - **Opponent**: TBA
  - **Reviewers**: Prof. Jörg Widmer, Prof. Carsten Griwodz

- **Helsinki University of Technology (TKK)**—Espoo, FI
  Majoring in Multimedia Networks and Signaling, 2006–2009

  - **Master Thesis**: *"Rate-control for Conversational H.264 Video Communication in Heterogeneous Networks"*, Dec 2010. Grade: 5.0, **Advisors**: Prof. Jörg Ott, D.Sc. I.D.D Curcio
    in collaboration with Nokia Research Center (NRC).

- **Visvesvaraya Technological University**—Bangalore, IN
  Bachelors in Telecommunication, 2000–2004

  - Focus areas: Mobile Communication and Embedded System Design
  - **Thesis**: *"Device management using SyncML."*, May 2004 [in collaboration with LG Electronics].
  - *"Using RSA for Encrypting Chat over TCP/IP"*; Chaitanya V.L., Singh V.; [http://jeclipse.sf.net/]

Publications

- **Conferences—**

  - *An Evaluation of RTP Circuit Breaker Performance on LTE Networks*; Sarker Z., Singh V., Perkins C., Proc. of IEEE Infocom Workshop, Toronto, Canada, Apr, 2014
  - *Considerations for distributed media processing in the cloud*; Globisch R., Singh V., Sienel J., Amon P., Uitto M., Schierl T., IEEE COMSOC MMTC E-Letter of March, IEEE, Mar, 2014
  - *Rate-control Using FEC for Interactive Multimedia*; Nagy M., Singh V., Ott J., Eggert L., In Proc. of ACM MMSys, Mar 2014
  - *Circuit Breakers for Multimedia Congestion Control*; Singh V., McQuistin S., Ellis M., Perkins C., IEEE Packet Video Workshop, Dec, 2013
  - *Performance Analysis of Receive-Side Real-Time Congestion Control for WebRTC*; Singh V., Lozano A. A., Ott J., IEEE Packet Video Workshop, Dec, 2013
  - *MPRTP: Multipath Considerations for Real-time Media*; Singh V., Ahsan S., Ott J., In Proc. of ACM MMSys, Feb 2013
  - *Congestion Control for Interactive Media: Control Loops & APIs*; Singh V., Ott J., Perkins C., In Proc. of IAB/IRTF Workshop on Congestion Control for Interactive RTC, Vancouver, CAN, Jul 2012
  - *Predictive Buffering for Streaming Video in 3G Networks*; Singh V., Ott J., and Curcio I.D.D., In Proc. of IEEE WoWMoM, San Francisco, US, 2012
  - *Rate-control for Conversational Video Communication in Heterogeneous Networks*; Singh V., Ott J., Curcio I.D.D., In Proc. of IEEE WoWMoM, San Francisco, US, 2012
  - *Energy Cost of Advertisements in Mobile Games on the Android Platform.*; Prochkova I., Singh V., Nurminen J.K., In Proc. of NGMAST, Paris, FR, 2012
  - *Architecture for Asymmetric P2P Group Communication*; Globisch R., Singh V., Wiegand T., Schierl T., In Proc. of IPTComm, Chicago, US, 2011.
  - *Rate Adaptation for Conversational 3G Video*; Singh, V.; Ott, J.; Curcio, I.D.D., In Proc. of IEEE INFOCOM Workshops, Rio de Janeiro, BR, 2009.

- *Evaluation of Error Resilience Mechanisms for 3G Conversational Video*; Devadoss J., Singh V., Ott J. et al., In Proc. of IEEE ISM, Berkeley, US, 2008.
- *Control over disclosure and privacy in a social environment*, Singh V., In Proc. of the Seminar on Internetworking, Antti Ylä-Jääski, Laura Takkinen (eds.), Helsinki, FI, 2008.

- **Talks, Posters and Demos—**
  - *Congestion Control and Performance Monitoring in WebRTC*; Singh V., Ott J.; The Real World Deployments, Upperside WebRTC Conference, Paris, FR, Dec 2014.
  - *RTC Performance Testing Monitoring and Management*; Singh V.; IIT Real-time Conference, Chicago, US, Oct 2014.
  - *Beyond Cloud Infrastructure*; Singh V.; IIT Real-time Conference, Chicago, US, Oct 2014.
  - *Introduction to WebRTC*; Singh V.; HelsinkiJS, Helsinki, FI, Sep 2014.
  - *Performance Monitoring of Media Flows in WebRTC*; Singh V., Ott J.; The Real World Deployments, Upperside WebRTC Conference, Paris, FR, Dec 2013.
  - *WebRTC Monitoring & Alerting*; Singh V.; The Global WebRTC Ecosystem Event, WebRTC Conference and Expo, Santa Clara, US, Nov 2013.
  - *Performance Monitoring of Media Flows in WebRTC*; Singh V.; IIT Real-time Conference, Chicago, US, Oct 2013.
  - *WebRTC for the Classroom*; Singh V., Lozano A. A., Ott J.; Aalto Research Day, Espoo, FI, Sept 2013.
  - *Predictive Buffering for Streaming Video in 3G Networks*; Singh V.; Adaptive Multimedia Workshop, Cisco, San Jose, CA, June 2012.
  - *A Rate-Control Framework for RTP-based Multimedia Applications*; Singh V.; MobiSys 2011, Washington D.C, USA.
  - *Rate-control for RTP-based Multimedia Applications*; Singh V.; WoWMoM 2011, Lucca, Italy.
  - *Mobile Video Calls*; Singh V.; Master of Arts Exhibition, May 2011, Helsinki, FI.
  - *Geo-Location Assisted Streaming Service Demo*, Singh V., Chaterjee S.; NRC, Dec 2009, Tampere, FI.
  - *Movable Multimedia Demo*, Singh V., Devadoss J., Mate S.; NRC, Dec 2007/Jun 2008, Tampere, FI.

- **World Wide Web Consortium (W3C)—**
  - *Identifiers for WebRTC's Statistics API*; Alvestrand .H, Singh V.; Web Real-Time Communications Working Group, work in progress, 2014.

- **Internet Engineering Task Force (IETF)—**
  - *RTCP XR for Bytes Discarded Metric*; Ott J. , Curcio I.D.D. , Singh V.; XRBLOCK WG, RFC7243, 2014.
  - *RTCP XR for Run Length Encoding (RLE) of Discarded Packets*; Singh V., Ott J., Curcio I.D.D. ; XRBLOCK WG, RFC7097, 2014.
  - *RTCP XR Report Block for De-jitter Buffer Metric Reporting*; Wu Q., Clark A., Hunt G., Singh V.; XRBLOCK WG, RFC7005, 2013.
  - *RTP Payload Format for Parity FEC*; Singh V., Begen A., Zanaty M.; PAYLOAD WG, (2014-*).
  - *Congestion Control Using FEC for Conversational Media*; Singh V., Nagy M., Ott J., Eggert L.; RMCAT WG, (2014-*).
  - *Test Cases for Evaluating RMCAT Proposals*; Sarker Z., Singh V., Zhu X., Ramalho M.; RMCAT WG, (2014-*).
  - *RTP Application Interaction with Congestion Control*; Zanaty M., Singh V., Nandakumar S.; RMCAT WG, (2014-*).
  - *Additional RTP Control Protocol (RTCP) Extended Report (XR) Metrics for WebRTC Statistics API*; Singh V., Huang R., Even R.; XRBLOCK WG, (2013-*).
  - *Improving ICE Interface Selection Using PCP Flow Extension*; Wing D., Reddy T., VerSteeg B., Penno R., Singh V.; MMUSIC WG, (2013-*).
  - *RTCP XR for Post-Repair Loss Count Metrics*; Huang R., Singh V.; XRBLOCK WG, (2013-*).
  - *Consideration for Selecting RTCP XR Metrics for RTCWEB Statistics API*; Singh V., Huang R., Even R., Romascanu D., Deng L.; XRBLOCK WG, (2013-*).

- *Evaluating Congestion Control for Interactive Real-time Media*; Singh V., Ott J.; RMCAT WG, (2012-*).
- *RTP Congestion Control: Circuit Breakers for Unicast Sessions*; Perkins C., Singh V.; AVTCore WG, (2012-*).
- *MPRTP attribute in Session Description Protocol*; Singh V., Ott J., Karkkainen T., Globisch R., Schierl T.; MMUSIC WG, (2012-*).
- *Multipath RTP (MPRTP)*; Singh V., Karkkainen T., Ott J., Ahsan S., Eggert L.; AVTCore WG, (2010-*).
- *RTP Control Protocol (RTCP) in Overlay Multicast*; Ott J., Singh V., Curcio I.D.D., Devadoss J.; AVTCore WG, (2011-*).

- **Patents and applications—**

  - *Method And Apparatus For Providing A Geo-predictive Streaming Service*, *Granted, US8391896*, I.D.D. Curcio, V. Singh, VK. Malamal-Vadakital; 2010
  - *Method and System for Creation and Control of Virtual Rendering Devices*, *Granted, US8644757*, I.D.D. Curcio, S. Mate, Y. Wang, J. Ott, J. Devadoss, V. Singh, J.T. Purho; 2008
  - *Methods And Apparatuses For Facilitating Determination Of A State Of A Receiver Buffer*, I.D.D. Curcio, J. Ott, V. Singh; 2010
  - *Device, system and method for measurement of physical activity*, S. Koski, S. Varun, M. Tasanen; 2010

- **Book Chapters—**
  authors in alphabetic order

  - *Discovering Opportunities for Sustainable Entrepreneurship*; F. Cristophe, Z. Hatami, T. Lyytinen, T. Raitio, V. Singh, L. Sivill; BitBang 3: Entrepreneurship and Services, May 2011, ISBN 978-952-60-3572-7.
  - *Dynamic Service Design in Healthcare*; H. Heikkilä, M. Kuikka, J. L. Peralta, A. Rahikkala, V. Singh, Z. Zhang; BitBang 3: Entrepreneurship and Services, May 2011, ISBN 978-952-60-3572-7.

- **Supervised Theses—**

  - *Performance Analysis of topologies for Web-based Real-Time Communication (WebRTC)*; Lozano A. A.,2013
  - *Using FEC for Rate Adaptation of Multimedia Streams*, Nagy M.; 2012.
  - *Multipath RTP: Applying Multipath Communication to Real-time Applications*, Ahsan S.; 2011.
  - *Crowd-sourcing mobile internet access statistics to improve video streaming*, Chaterjee S.; 2010.

Work Experience

- **Dialogue.io**—*Startup*, Espoo, FI
  CEO, Co-founder: Nov, 2007– Present

  - `callstats.io` – Analytics for WebRTC, a backend as a service that helps WebRTC services in monitoring and diagnosing video and audio calls.
  - Manage the product development, acquire customers, provide customer support, debug and manage fixes.
  - Architecture design of the service, dashboard, etc.
  - node.js, django, python, d3.js, websockets, message-queues

- **Aalto University**—*Communication and Networking Department*, Espoo, FI
  Researcher: Jan, 2007– Present

  - Protocol and architecture design for multimedia systems.
  - Course Assistant for Network Multimedia Protocol and Services, Protocol Design, Design of Simulation Networks - involves assignment development & grading.
  - Teaching 15hrs/semester on a graduate level courses (above mentioned) (Fall 2008 - Present).

- **Tuubio**—Helsinki, FI
  Product Developer, Jul 2011–Dec 2011

  - 5 persons startup. Tuubio is a customized radio service: *Spotify with news*.

- – Developed the **iPhone** client and the backend service architecture in **Web2Py**.
- – Led the team to its alpha launch.
- – Developed algorithms for adapting the ratio of news, music, advertisement and talk-show hosts based on user's preferences, listening attributes.

- **FunRank**—Helsinki, FI
  Co-founder, Jul 2010–Jan 2011

  - – "Location-based service that provides personalized suggestions of interesting activities to do (happening) near you".
  - – with Kristo Ovaska and Ramine Darabiha. Raised 50K eur.
  - – Design, develop, execute.

- **Modz Oy/Bloomjack Oy**—Helsinki, FI
  Embedded Systems Designer: Sep, 2009–Sep 2010

  - – Modz is not just a fitness meter for kids, the device and service is envisioned as a individual score-keeper, personal motivator and can be used for collaborative game-play.
  - – Involved in the technology development of the product and service

- **Nokia Research Center (NRC)**—*Multimedia and Transports*, Helsinki/Tampere, FI
  Jan 2007–Feb 2010

  - – Developed *"Geo Location Assisted Streaming Service"* proof of concept/prototype using GStreamer/VLC Player, Postgre SQL and Darwin Streaming Server, **on Maemo/Linux**, (May–Dec 10).
  - – Developed *"Movable multimedia"* proof of concept/prototype for Nokia N95 smartphone using SIP/UPnP (DLNA), Transcoding RTP to HTTP, **on Symbian/S60**, (Nov 07–Jul 08).

- **STMicroelectronics NV**—Noida, IN/Paris, FR
  System Software Programmer: Aug 2004–Jul 2006

  - – Middleware for Video Communication, Video Recording, Still Capture and device driver for Camera.
  - – **LG KS 10, N96**, on Symbian 9.x/S60 3.x, *Noida, India, May 05 – Jul 06*
  - – **Alcatel low cost mobile-phone**, on Micro-chorus OS, *Paris, France, Aug 04 – Apr 05*

- **LG Electronics**—**Convergent Technology Group**, Bangalore, IN
  Products Intern: Mar, 2004–Aug, 2004

  - – Developed modules (Archiver, Tree Management) for the SyncML Client and tools such as SyncML Testing Server. **(C/C++)**

Achievements and Activities

- **Special session co-chair**: WebRTC v2.0 (PV2013).
- **Reviewer–Conference**: INFOCOM 2012, 2013, IEEE Packet Video 2013, IEEE ICECCO 2013, ICDCS 2014, IFIP Networking 2014, Mobiquitous 2014
- **Reviewer–Journals**: IEEE JSAC AMS
- Masters Programme Committee at the School of Electrical Engineering, 2011 and 2012
- Academic Committee of Electrical Engineering, 2012
- Certificate for Pedagogical Studies (inter-disciplinary education), Summer 2011.
- IEEE Travel Grant to present at WoWMoM, 2011.
- Future Internet Graduate School Scholarship, Finland (2011-2013).
- Nokia Fellowship Grant recipient, 5000 euros (2010).
- Founding Member of Aalto Entrepreneurship Society [AALTOES] (2009-2011)