

University of Auckland  
Standard  
**ACADEMIC CV**



**THE UNIVERSITY OF AUCKLAND**  
**NEW ZEALAND**

**NAME:** Nevil Brownlee  
**CURRENT POSITION:** Associate Professor  
**DEPARTMENT:** Computer Science  
**FACULTY:** Science

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**EDUCATIONAL QUALIFICATIONS:** [Tertiary only]

1975 University of Auckland, PhD, Atmospheric Physics  
1968 University of Auckland, MSc  
1965 University of Auckland, BSc

**PREVIOUS APPOINTMENTS:**

1970-2000 University of Auckland, Director, Technology Development (ITSS)  
2001-2003 UC San Diego, Researcher, CAIDA (50%)  
University of Auckland, ITSS (50%)  
2004- University of Auckland, Associate Professor (75%)  
University of Auckland, ITSS (25%)

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**SIGNIFICANT DISTINCTIONS / AWARDS:**

**PROFESSIONAL SOCIETIES / SERVICE / OTHER ACTIVITIES:**

IEEE Internet Technical Award Committee  
2007; Chair 2008, 2009; Past Chair 2010  
Independent Submissions Editor for the RFC series  
2010–

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**TEACHING:** [Undergraduate Programmes, Postgraduates – number, dates, achievements, development, qualitative evidence, teaching profile, summary of evaluations, etc]

2000	Taught 1/3 of 742, Networks and Communications
2001	Taught 1/4 of 742, Networks and Communications
2003	Taught 1/4 of 742, Networks and Communications
2004	Teaching 2/3 of 742, Networks and Communications + 1/4 314s2, Networks and Communications + 1/4 230, Software Design & Construction
2005-2006	Taught all of 742 + 1/2 of 314s1
2007	Taught 3/4 of 742 + 1/6 of 314s1
2008	Taught 3/4 of 742, 1/3 of 314s2
2009	Teaching 3/4 of 742, 1/3 of 314s2, 1/3 Of 220
2010	Teaching 2/3 of 742, 1/3 of 314s2, 1/3 Of 220

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## RESEARCH SPECIALTIES / CAREER:

### Summary Statement:

I worked in the University of Auckland Computer Centre (now ITSS), developing the university's campus network, and of the Internet in New Zealand. In the course of that work I became strongly involved in Internet Standards work, producing the Internet Standard for traffic flow measurement (RTFM and IPFIX), and contributed strongly in other areas, e.g. Authentication, Authorisation and Accounting (AAA) and in network security. In 2008, the IETF's IPFIX working group published three Internet Standards documents; I continue to be co-chair for IPFIX.

My open-source traffic measurement system, NeTraMet was widely used both by Internet Service Providers (to collect accounting data) and for network research worldwide.

Through my work at CAIDA (UC San Diego) I have become well-known in the area of network measurements. In particular I have particular interests in measuring and monitoring the performance of the global Domain Name System (DNS).

From 2004, as a 75% Academic, I have continued my research in Internet Measurements, and have continued to work with CAIDA and WAND (U Waikato) on better ways of measuring and analysing Internet traffic. As well I have been closely involved in the design and implementation of KAREN – New Zealand's Research and Education network, and continue to be involved in BeSTGRID – the most visible face of eResearch at the University of Auckland.

From October 08 through July 09 I developed a new traffic meter for ITS here, one that produces flow records with route and usercode (UPI) information. This is now in production as part of our system for monitoring the University's Internet usage.

In 2009 and 2010 I have worked on Internet Security, analysing one-way traffic reaching the UC San Diego Network Telescope, and developing a One-Way Traffic Monitor (owtmon) to capture one-way traffic data in real time at Auckland.

### Refereed Journal Articles:

SPEIDEL, U., EIMANN, R., BROWNLEE, J.N., 'Entropy Techniques for Network Event Detection.' *Mediterranean Journal of Computers and Networks*, Jan 2008

LEE, D., BROWNLEE, N., 'Passive measurement of one-way and two-way flow lifetimes.' *SIGCOMM Computer Communications Review*, July 2007

BROWNLEE, N., CLAFFY, K., 'Understanding Internet Traffic Streams: Dragonflies and Tortoises.' *IEEE Communications Magazine*, October 2002

BROWNLEE, N., FULTON, R., 'Kawaihiko and the 3rd Quartile Day.' *IEEE Communications Magazine*, July 2000

BROWNLEE, N., 'Network Management and realtime Traffic Flow Measurement.' *J Network and Systems Management*, Vol 6, No 2, 1998, pp 223-227

BROWNLEE, N., 'Internet Pricing in Practice, (reprint of NZ Experiences, 1996), In McKnight, L.W., Baily, J.P. (Ed.), "Internet Economics". Boston, MIT Press, 1997

BROWNLEE, N., 'New Zealand Experiences with Network Traffic Charging.' *Journal of Electronic Publishing*, Vol 2, Issue 1, May 1996, <http://www.press.umich.edu/jep/works/sourcefiles/brownlee.html>

BROWNLEE, N., 'An Algol-Based Implementation of SNOBOL4 Patterns.' *CACM*, Vol 20, No 7, pp 527-529, 1977

BROWNLEE, N., 'Some measurements of atmospheric ion mobility spectra and conductivity at Auckland.' *J Atmospheric and Terrestrial Physics*, Vol 37, pp 1145-1149, 1975

BROWNLEE, N., 'A new approach to atmospheric-ion mobility spectrometry.' *J Atmospheric and Terrestrial Physics*, Vol 37, pp 1139-1144, 1975

#### **Sections in books:**

MUNIDAR, P.S.(ED), 'Practical Handbook of Internet Computing, chapter on "Measuring the Internet," (with K. Claffy).' *Chapman & Hall/CRC*, 2004, ISBN 1584883812

#### **Reviews and Comments:**

BROWNLEE, N., 'Guest Editor (with K.Claffy) special section on "Internet Measurement".' *IEEE Internet Computing*, Sep/Oct 2004

#### **Invited Conference Presentations:**

BROWNLEE, N., 'Measuring Internet Evolution (Keynote Presentation).' *APAN 26 Measurement Working Group, Queenstown*, 4-8 August, 2008  
Conference Contribution - Paper Published on Proceedings

BROWNLEE, N., 'Passive Measurements for Production Networks.' *NORDUnet 22, Longyearbyen*, 5-8 April, 2004

#### **Refereed Conference Proceedings:**

LEE, D.J., CARPENTER, B.E., BROWNLEE, J.N., 'Observations of UDP to TCP Ratio and Port Numbers.' *Fifth International Conference on Internet Monitoring and Protection (ICIMP)*, May 2010

CHATZIS, N., POPESCU-ZELETIN, R., BROWNLEE, N., 'Email worm detection by wavelet analysis of DNS query streams.' *IEEE Symposium on Computational Intelligence in Cyber Security, 2009. CICS '09*, 30 March - 2 April 2009

CHATZIS, N., BROWNLEE, N., 'Similarity Search over DNS Query Streams for Email Worm Detection.' *International Conference on Advanced Information Networking and Applications, AINA 2009, Bradford*, 26-29 May 2009

LEE, D.J., BROWNLEE, J.N., 'On the Variability of Internet Host Interactions.' *GLOBECOM 2008, EIEEE Global Telecommunications Conference*, New Orleans, 30 Nov 08 - 4 Dec 08, 2008

SPEIDEL, U., EIMANN, R., BROWNLEE, N., 'Detecting Network Events via T-Entropy.' *Sixth International Conference on Information, Communications and Signal Processing (ICICS2007)*, Dec 2007

LEE, D., BROWNLEE, N., 'Host Measurement of Network Traffic.' *IEEE Australasian Telecommunication Networks and Applications Conference (ATNAC 2007)*, Dec 2007

LEE, D., BROWNLEE, N., 'A Methodology for Finding Significant Network Hosts.' *32nd IEEE Conference on Local Computer Networks (LCN 2007)*, Oct 2007

- ZDRNJA, B., BROWNLEE, N., WESSELS, D., 'Passive Monitoring of DNS Anomalies.' *Fourth GI International Conference on Detection of Intrusions, Malware & Vulnerability Assessment (DIMVA2007)* Jul 2007
- LIU, Z., HUFFAKER, B., FOMENKOVA, M., BROWNLEE, N., CLAFFY, K., 'Two Days in the Life of the DNS Anycast Root Servers.' *Passive & Active Measurement Conference (PAM2007)*, Apr 2007
- EIMANN, R., SPEIDEL, U., BRWONLEE, N., 'A T-entropy Analysis of the Slammer Worm Outbreak.' *Asia-Pacific Network Operations and Management Symposium (APNOMS2005)*, Sep 2005
- SHRIRAM, A., MURRAY, M., HYUN, Y., BROWNLEE, N., BROIDO, A., FOMENKOVA, M., CLAFFY, K., 'Comparison of Public End-to-End Bandwidth Estimation Tools on High-Speed Links.' *Passive & Active Measurement Conference (PAM2005)*, Mar 2005
- SHAKKOTTAI, S., BROWNLEE, N., CLAFFY, K., 'A Study of Burstiness in TCP Flows.' *Passive & Active Measurement Conference (PAM2005)*, Mar 2005
- BROWNLEE, N., 'Some Observations of Internet Stream Lifetimes.' *Passive & Active Measurement Conference (PAM2005)*, Mar 2005
- KARAGIANNIS, T., BROIDO, A., BROWNLEE, N., CLAFFY, K., FALOUTSOS, N., 'IS P2P dying or just hiding?.' *IEEE Globecom 2004 - Global Internet and Next Generation Networks, Dallas, Texas, November, 2004*
- WESSELS, D., FOMENKOV, M., BROWNLEE, N., CLAFFY, K., 'Measurements and Laboratory Simulations of the Upper DNS Hierarchy.' *Passive & Active Measurement Workshop (PAM2004)*, Juan les Pins, Nice, 2004
- BROWNLEE, N., CHRIST, P., JAEHNERT, J., LIANG, Y., SRINIVASAN, K., ZHOU, J., 'MobyDick FlowVis - Using NeTraMet for distributed protocol analysis in a 4G network environment.' *IEEE Workshop on IP Operations and Management (IPOM)*, October 2003
- LINDH, T., BROWNLEE, N., 'Integrating Active Methods and Flow Meters - an implementation using NeTraMet.' *Passive & Active Measurement Workshop (PAM2003)*, San Diego, 2004
- BROWNLEE, N., ZIEDINS, I., 'Response time distributions for global name servers.' *Passive & Active Measurement Workshop (PAM2002)*, Fort Collins, 2002
- BROWNLEE, N., CLAFFY, K., 'Internet Stream Size Distributions.' *ACM SIGMETRICS, Marina del Ray, 2002*
- BROWNLEE, N., CLAFFY, K., NEMETH, E., 'DNS Root/gTLD Performance Measurements.' *Userix LISA 2001, San Diego, December 2001*
- BROWNLEE, N., CLAFFY, K., NEMETH, E., 'DNS Measurements at a Root Server.' *Globecom 2001, November 2001*
- BROWNLEE, N., CLAFFY, K., MURRAY, M., NEMETH, E., 'Methodology for Passive Analysis of a University Internet Link.' *Passive & Active Measurement Workshop (PAM2001)*, Amsterdam, April 2001
- BROWNLEE, N., MURRAY, M., 'Streams, Flows and Torrents.' *Passive & Active Measurement Workshop (PAM2001)*, Amsterdam, April 2001
- BROWNLEE, N., 'Using NeTraMet for Production Traffic Measurement.' *Intelligent Management Conference (IM2001)*, Seattle, May 2001
- MICHEEL, J., GRAHAM, I., BROWNLEE, N., 'The Auckland data set: an access link observed.' *Proceedings of 14th ITC, Girona, April 2001*

#### Technical Reports:

- KARAGIANNIS, T., BROIDO, A., BROWNLEE, N., CLAFFY, K., FALOUTSOS, M., 'File-sharing in the Internet: A characterization of P2P traffic in the backbone.' *Technical Report, UC Riverside, 2003*

BROWNLEE, N. (ED), 'Network Measurement FAQ.' *CAIDA Metrics Working Group report*, January, 2001, <http://www.caida.org/outreach/metricswg/faq.xml>

BROWNLEE, N., LOOSLEY, C., 'Fundamentals of Internet Measurement - A Tutorial.' *CMG Journal of Computer Resource Management*, April 2001

BROWNLEE, N., 'Traffic Measurement: An Overview.' *Asia & Pacific Internet Association Newsletter No. 4*, Winter (February) 2000

ALEXANDER, R., BROWNLEE, N., ZIEDINS, I., 'Modelling Self-Similar Network Traffic.' *Statistics Dept Report, University of Auckland*, 1995, <http://www.stat.auckland.ac.nz/reports/report95/stat9514.html>

#### **Internet Standards (RFCs):**

T. ZSEBY, E. BOSCHI, N. BROWNLEE, B. CLAISE, 'IP Flow Information Export (IPFIX) Applicability.' *Rfc 5472*, March 2009

G. SADASIVAN, N. BROWNLEE, B. CLAISE, J. QUITTEK, 'Architecture for IP Flow Information Export.' *Rfc 5470*, March 2009

BROWNLEE, N., BLOUNT, A., 'Accounting Attributes and Record Formats.' *RFC 2924*, Sep 2000

HANDELMAN, S., STIBLER, S., BROWNLEE, N., RUTH, G., 'New Attributes for Traffic Flow Measurement.' *RFC 2724*, Oct 1999

BROWNLEE, N., 'SRL: A Language for Describing Traffic Flows and Specifying Actions for Flow Groups.' *RFC 2723*, Oct 1999

BROWNLEE, N., MILLS, C., RUTH, G., 'Traffic Flow Measurement: Architecture.' *RFC 2722 (replaces RFC 2063)*, Oct 1999

BROWNLEE, N., 'RTFM: Applicability Statement.' *RFC 2721*, Oct 99

BROWNLEE, N., 'Traffic Flow Measurement: Meter MIB.' *RFC 2720 (replaces 2064)*, Oct 99

BROWNLEE, N., GUTTMAN, E., 'Expectations for Computer Security Incident Response.' *RFC 2350*, Jun 1998

FRASER, B., 'Site Security Handbook, sections on modem and physical security.' *RFC 2196*, Sep 1997

BROWNLEE, N., 'Traffic Flow Measurement: Experiences with NeTraMet.' *RFC 2123*, Mar 1997

BROWNLEE, N., 'Accounting Requirements for IPng.' *RFC 1672*, Aug 1994

#### **Research Grants / Funding:**

#### **Invited Lectures:**

BROWNLEE, J.N., 'Internet Challenges: Are there limits to the Internet's growth?.' *Gibbons Lecture Series, University of Auckland*, May 2010