

Iñigo Urteaga

15/04/1984, Donostia (Spain)

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Education

2002-2008 Telecommunication Engineering (MS) at Bilbao Engineering faculty, UPV/EHU (Spain)

Main Courses:

Theory of Communication
Data Communication
Signals and systems
Electromagnetic fields, Antennae, Radio-communications
Optical communications
Telecommunication Network and Services
Analog & Digital Electronics, Communication Electronics
Computer architecture, Operating Systems and Networking

Main Projects:

- **OS and Networking project:**
HTTP web server (**Linux C** programming, threads, sockets)
- **Network communications:**
TCP/IP stack, ATM, BGP, OSPF, SNMP...
- **Signal processing:**
filtering, FFT, etc. (both in Matlab and DSP)
- **Network administration & management project:**
CISCO routers & switches, servers, VLAN, firewall...
- **Communications project:** Instant messaging application
Java, client-server architecture, RMI, servlets, sockets, Real-time Transport Protocol
- **Programming project:**
Image processing application in C, C++
- **Electronics project:** Ultrasound based distance-meter
Micro-controller PIC16F876, assembly language programming, circuit board set-up

2000-2002 Scientific-Technical LOGSE “Axular Lizeoa”, Donostia, (Spain)

Qualification: “Honors”

Master Thesis

(as a exchange student at Colorado School of Mines, USA)

Qualification: 10/10

Abstract: *The master thesis consisted on designing, implementing and evaluating a fault detection service for wireless sensor applications, named REDFLAG. It is a run-time, distributed and flexible detector of faults, that is also lightweight in terms of both footprint and energy consumption. REDFLAG addresses the two most worrisome issues in data-driven wireless sensor applications: abnormal or erroneous data and missing data. It exposes faults as they occur in an on-line fashion by using distributed algorithms in order to conserve energy.*

REDFLAG is implemented for wireless sensor nodes running TinyOS. The experimental results show that it is lightweight both in terms of footprint and required power resources, while ensuring satisfactory detection and diagnosis accuracy. As a matter of fact, REDFLAG has been applied into a subsurface contaminant transport model to improve its performance in the presence of erroneous wireless sensor data.

The research done throughout the Master Thesis lead to several publications, among whom the PMC journal paper named “REDFLAG: A Run-Time, Distributed, Flexible, Lightweight And Generic Fault Detection Service for Data Driven Wireless Sensor Applications” stands out.

Experience

07/2009-Present

Researcher at Tecnia-Telecom

<http://www.tecnalia.com/>

Project: SAIL European research project

- Research on **Delay/Disruption Tolerant Networks**.
- Responsible for the design and implementation (Linux based, C programming) of innovative **DTN routing** protocols and applications in resource constraint nodes:
 - Wireless sensor nodes, smart-phones (Android)
- New techniques as **network coding** are considered for efficient routing.
- Human mobility analysis and pattern extraction, for **intelligent routing**.
- DTN application prototyping based on several wireless technologies: Bluetooth & WiFi

Project: TelMAX research project (CENIT N° CEN20071036)

- Broadband Professional Mobile Communication System design.
- Research and development of multimedia applications over **wireless networks**:
 - Advanced multimedia coding: H.264/SVC, AAC
 - Context-aware adaptive multimedia streaming
- Research on new interworking mechanisms for **heterogeneous networks**
 - Media independent handover: IEEE 802.21 standard
- Network simulation (NS-2) and real prototype validation

01/2009-07/2009

Telecommunication Engineer at Traintic S.L

<http://www.traintic.com/>

Area: **I2V & V2V networking** within the railway sector

- Development and deployment of Infrastructure-to-Vehicle and Vehicle-to-Vehicle wireless communications: GPRS/3G, WiFi, WiMAX, etc.
- Design and development of on-board Ethernet based railway networking
 - Switch configuration, validation and performance testing
- Train applications over Ethernet and IP technology.

08/2007-06/2008

Research assistant at CSM, USA

<http://www.mines.edu>

Advisor: Dr. Qi Han

<http://www.mines.edu/~qhan/>

Area: Research on **WSN Networking** and Distributed Systems

- **Embedded programming** in wireless sensor nodes (C, nesC)
- Fault Detection **algorithms**, routing protocols in Wireless Sensor Networks
- Subsurface monitoring application using Wireless Sensor Networks
- Wireless Sensor Network application **simulation and testing** (TinyOS, TOSSIM)

04/2005-06/2007

Research Scholarship, NQaS group at ETSI Bilbao, UPV/EHU

<http://det.bi.ehu.es/NQaS>

Advisor: Alex Muñoz Mateos

Area: Research on network quality and service

- Network traffic analysis tools
- Traffic capture and analysis sensor based on Linux equipment
- LAN network installation and maintenance
- UNIX/Linux server administration

Scientific publications

Conference Proceedings

“AWARE: An Activity AWARE Network Clustering Algorithm for Wireless Sensor Networks”

Iñigo Urteaga, Na Yu, Nicholas Hubbell and Qi Han

IEEE SECON (Conference on Sensor, Mesh and Ad Hoc Communications and Networks), 2011, Under review

“On the Design of a Scalable Multimedia Streaming System based on Receiver-Driven Flow and Congestion Awareness”,

Iñigo Urteaga, Iraide Unanue, Javier Del Ser, Pedro Sánchez and Aitor Rodríguez,

7th International Joint conference on e-Business and Telecommunications, SIGMAP 2010, Athens, Greece, July 2010

“REDFLAG: A Run-time, Distributed, Flexible, Lightweight, And Generic Fault Detection Service for Data-Driven Wireless Sensor Applications”,

Iñigo Urteaga, Kevin Barnhart, Qi Han

IEEE International Conference on Pervasive Computing and Communications: PerCom 2009, Galveston, TX, March 2009.

“Integration of Groundwater Transport Models with Wireless Sensor Networks”,

Kevin Barnhart, **Iñigo Urteaga**, Qi Han, Anura Jayasumana, Tissa Illangasekare

MODFLOW and More 2008: Groundwater and Public Policy, 2008

“Subsurface Transport Model Performance in the Data Context of Wireless Sensor Networks”,

Kevin Barnhart, **Iñigo Urteaga**, Qi Han, Paul Schulte, Anura Jayasumana, Tissa Illangasekare

AGU Fall Meeting, December, 2008, San Francisco, California

“Combining Wireless Sensor Networks and Groundwater Transport Models: Protocol and Model Development in a Simulative Environment”,

Kevin Barnhart, **Iñigo Urteaga**, Qi Han, Lisa Porta, Anura Jayasumana, Tissa Illangasekare

AGU Fall Meeting, December 2007, San Francisco, California

Journals and Book Chapters

“A Tutorial on H.264/SVC Scalable Video Coding and Its Tradeoff between Quality, Coding Efficiency and Performance ”

Iraide Unanue, **Iñigo Urteaga**, Javier Del Ser, Ronaldo Husemann, Valter Roesler, Aitor Rodríguez and Pedro Sánchez

INTECH Book on Video Coding, 2011, Accepted, to be published.

“REDFLAG: A Run-time, Distributed, Flexible, Lightweight, And Generic Fault Detection Service for Data-Driven Wireless Sensor Applications”

Iñigo Urteaga, Kevin Barnhart, Qi Han

Pervasive and Mobile Computing (PMC) Journal, Vol. 5, No. 5, October 2009.

“On Integrating Groundwater Transport Models with Wireless Sensor Networks”,

Kevin Barnhart, **Iñigo Urteaga**, Qi Han, Anura P. Jayasumana, Tissa Illangasekare

Journal of Ground Water, Vol. 48, No. 5, issue. 5, pages 771–780, February 22 2010.

“A Wireless Sensor System for Validation of Real-time Automatic Calibration of Groundwater Transport Models”,

Philip Loden, Qi Han, Lisa Porta, **Iñigo Urteaga**, Kevin Barnhart, Doug Hakkarinen, Tissa Illangasekare and Anura Jayasumana,

Journal of Systems and Software, Vol. 82, No. 11, November 2009.

Attended complementary seminars & courses

11/08-10/2010	Hand on Wireless & Mobile IV: Inspiring a Smarter Future Internet of Things, Cognitive Radio, Compressed Sensing, smart and evolutionary algorithms Intelligent Transport Systems, Next generation TV
06/24-28/2010	Intelligent Transport System seminar at Escuela Técnica Superior de Ingeniería, UPV/EHU, Bilbao <i>Toward Fully Networked Vehicle</i> by Jean Marie Bonnin, Telecom Bretagne (France) Overview of safety and infotainment services in vehicles, using either the Internet or car to car communications. Wireless communication technology diversity and IPv6 mobility protocols for full connectivity. <i>Wireless Telecommunication and Localization for ITS</i> by Marion Berbineau, INRETS (France) Wireless communication, localization and surveillance systems for ITS applications. Intelligent mobility, telecommunication challenges and future trends.
03/25/2010	6LoWPAN: The Wireless Embedded Internet by Deusto Technology Foundation IPv6 for low power wireless networks, IEEE 802.15.4, mobility and routing protocols, applications
07/20/2009	WiMAX for professional networks by Webimar-Quobis WiMAX Mobile (IEEE 802.16e) based applications and services.
08-12/2007	Algorithms course at Colorado School of Mines Professor: Dinesh P. Mehta Description: Divide-and-conquer, greedy algorithms, dynamic programming, searches and traversals, techniques of backtracking, branch-and-bound techniques, techniques in lower bound theory.
2/28/2007	"Evolución de las Tecnologías de medida Inalámbricas" by Agilent Technologies Evolution of wireless technologies, WiMAX, MIMO, WiMedia, etc.
11/15-17/2006	Hands-on Wireless & Mobile III: Wireless technologies Ad-hoc and wireless sensor networks, short-range wireless technologies, wWAN, digital broadcasting.
10/19-20/2006	MUSE Autumn School 2006 , Magisterial Classes on Access Technologies R&D of future multi-service access networks that provide secure connectivity between end-user terminals and edge nodes in a multi-provider environment. Network wireless & wired architecture and solutions for the first mile, and interworking with the home network.

Technical Skills

Operating Systems:	Windows & UNIX/Linux (Ubuntu, Debian, OpenSolaris)
Programming:	C, C++, Python, Java, Shell scripting, assembly language
Network Simulation	Network Simulator 2 (NS-2), TOSSIM
Network Analysis	Wireshark, tcpdump, nmap
WSN tools	TinyOS, nesC programming, TOSSIM
Scientific	Matlab/Octave, Mathematica
Lab Skills	Digital/Analog Scopes & electronic tools, Spectrum Analyzer, Function Generator
Miscellaneous:	MySQL, SVN, CVS, LaTeX, gnuplot, Virtualbox/VMware

Language Skills

Spanish	Native Language	
Euskera (Basque)	Native Language	<i>EGA Certificate (07/03/2001)</i>
English	Advanced Level	<i>TOEFL iBT 113 points (13/11/2010)</i> <i>TOEFL iBT 105 points (03/23/2007)</i> <i>First Certificate in English Cambridge (03/2002)</i>
French	Intermediate Level	

Personal interests

Music	Symphonic Orchestra member and flute soloist (1998-2005) <i>“Escuela Municipal de Música de San Sebastián”</i> I play the guitar since 2002
Sports	Soccer (<i>“Axular Lizeoa”</i> Soccer Club player & Captain , 1998-2003) Cycling, skiing, swimming