

Dr. Ratnesh Sahay

Head of Research Unit, Fellow and Adjunct Lecturer
Semantics in eHealth and Life Sciences (SeLS)
Insight Centre for Data Analytics
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December 15, 2017

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Overview

- 13 years of research and development (R&D) experience in data interoperability and analytics solutions for the healthcare, clinical trial, and cancer genomics domains
- Coordinating funding acquisitions and proposals from national and European funding agencies
- Coordinating project development activities including planning, requirement analysis, finalising specifications, quality assurance, risk management, and troubleshooting within a project life cycle
- Developing schedules, budget planning, dissemination and exploitation strategies to ensure completion of project as per quality assurance parameters
- Collaborating and working knowledge of industry standardisations like Health Level Seven (HL7), Medical Dictionary for Regulatory Activities (MedDRA), and World Wide Web Consortium (W3C)
- Experience in linking/connecting large-scale biomedical and cancer genomics repositories TCGA, COSMIC, Gene Ontology (GO), KEGG, Reactome, etc. and developing analytics over well-connected repositories
- Experience in linking/connecting clinical trial repositories (phase III & IV) and developing analytics over well-connected repositories
- Experience in linking/connecting Electronic Health Records (EHRs) hosted in hospitals and developing analytics over well-connected Electronic Health Record (EHR) systems
- Experience in creating Intellectual Property (IP) including commercialisation routes (e.g., licensing, open-source) for healthcare projects
- Scientific publications in renowned journals and conferences
- Teaching & supervising MSc/PhD students

Education

- **National University of Ireland, Galway (NUIG)**
PhD Computer Science, Specialisation: Healthcare Informatics 2006 - 2012
 - Title: An Ontological Framework for Interoperability of Health Level Seven (HL7) Applications - the PPEPR Methodology and System
 - Supervisors: Prof. Axel Polleres & Prof. Manfred Hauswirth
 - Examiners: Dr. Jeff Z. Pan & Prof. Alberto Fernández Gil
- **KTH Royal Institute of Technology, Stockholm, Sweden**
MSc Information Technology, Specialisation: Distributed Systems 2004 - 2006
- **University of Southern Queensland, Australia**
Bachelor of Information Technology (BIT) 1997 - 2001

Appointments

- **Head of Research Unit**
Insight Centre for Data Analytics, Galway, Ireland *May 2013 - present*
- **Post-Doctoral Research Associate**
Digital Enterprise Research Institute, NUI Galway, Ireland *Nov. 2011 - May 2013*
- **Research Assistant and PhD Researcher**
Digital Enterprise Research Institute, NUI Galway, Ireland *May 2006 - Nov. 2011*
- **Analyst Programmer**
Amorphous Health (now USM Specialist Centre), Malaysia *Feb. 2002 - Nov. 2003*

Projects & Working Experiences

- **Project: BIOOPENER** Role: **Project Leader**
Area: Interoperability and Analytics over Cancer Genomics Data *January 2017 - present*
- **Project: Connected Health** Role: **Deputy Leader**
Area: Interoperability and Analytics over EHRs *Feb 2013 - present*
- **Project: SIFEM** Role: **Coordinator**
Area: Interoperability and Analytics over Biosimulation Data *Feb. 2013 - 2016*
- **Project: Linked2Safety** Role: **Technical Coordinator**
Area: Interoperability and Analytics over Clinical Trial Data *Oct. 2011 - Oct. 2014*
- **Project: Granatum** Role: **Advisor**
Area: Interoperability of cancer Chemoprevention Repositories *May. 2010 - May 2013*
- **Project: PPEPR** Role: **Innovator and Developer**
Area: Interoperability of Electronic Health Records (EHRs) *May 2006 - Apr. 2009*
- **Project: RIDE** Role: **Research Assistant**
Area: Interoperability of Electronic Health Records (EHRs) *May. 2006 - Dec. 2007*
- **Company: Amorphous Health (USM Specialist Centre)** Role: **Analyst Programmer**
Area: Database Design and Development of Clinical Applications *Feb. 2002 - Nov. 2003*

Standardisation Working Groups, Interest Groups, And Technical Committees

- **Member of the W3C Potential Drug-Drug Interaction WG** 2016-present
- **Member of the Global Alliance for Genomics and Health** 2013-present
- **Member of the HL7 - OWL WG** 2013-present
- **Member of the W3C HCLS Clinical Observation Interoperability (COI)** 2008-2010
- **Member of the Conceptual Models for Services (CMS) WG** 2007-2009
- **Member of the W3C Web Ontology Language (OWL) WG** 2007-2012

- **Member of the Semantic Web Services (SWS) Challenge Group WG** 2007-2008
- **Member of the OASIS Semantic Execution Environment (SEE) TC** 2007-2008

Grants & Fund Acquisitions

- **Deputy Leader of Linked Data - eHealth and Life Sciences** Funding: SFI
Total Funding: 954,929 Euros
- **Co-applicant & Coordinator of Linked2Safety project** Funding: EU FP7
Total Funding: 3,099,000 Euros
- **Co-applicant & Technical Coordinator of SIFEM project** Funding: EU FP7
Total Funding: 2,909,000 Euros
- **Main Applicant of PPEPR-2 feasibility support** Funding: EI CCS
Total Funding: 15,000 Euros

Patents and Licences

- Plug and Play Electronic Patients Records (PPEPR) software is licensed by SlidePath – a clinical data integration company. Slidepath is now acquired by Leica Microsystems

Honours and Awards

- **Best Paper:** Muntazir Mehdi, Yasar Khan, Andre Freitas, Joao Bosco Jares, Saleem Raza, Panagiotis Hasapis, and Ratnesh Sahay. A Linked Data Visualiser for Finite Element Biosimulations. In proceedings of the tenth IEEE International Conference on Semantic Computing, California, USA, 2016
- **Best Paper:** Muntazir Mehdi, Aftab Iqbal, Ali Hasnain, Yasar Khan, Stefan Decker, and Ratnesh Sahay. Utilizing Domain-Specific Keywords for Discovering Public SPARQL Endpoints: A Life-Sciences Use-Case. In 29th Annual ACM Symposium on Applied Computing, the Semantic Web and Applications (SWA) track, Gyeongju, Korea, 2014

Supervision

PhD Studies

PhD Supervisor of:

- Alok Jha, NUI Galway, Ireland [2015-present]
- Daniela Oliveira, NUI Galway, Ireland [2015-present]
- Yasar Khan, NUI Galway, Ireland [2016-present]
- Qaiser Mehmood, NUI Galway, Ireland [2016-present]

Member of Graduate Research Committee (GRC):

- Arindam Haldar, NUI Galway, Ireland
- Laleh Kazemzadeh, NUI Galway, Ireland [finished]

Master Studies

Co-Supervisor of:

- Muntazir Mehdi, TU Kaiserslautern, Germany [2013-2014] [finished]
- Swapnil Soni, Wright State University, USA [2013-2014] [finished]

Supervisor of:

- Durre Zehra, NUI Galway, Ireland [2016-present]
- Joao Jares, NUI Galway, Ireland [2015-2017] [finished]

Research Interest

- Electronic Health Records (EHRs)
- Multidimensional (statistical) Clinical Dataset
- Precision Medicine)
- Web Service Architecture and Design
- Semantic Web
- Ontology Building, alignment, & Reasoning
- Linked Data
- Web Databases and Query Languages
- Knowledge Graph
- Graph Traversal and Analytics
- Search Technologies
- Big Data and Polystore Databases

Editor, Chair, Reviewer and Program Committee
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- Steering Committee Member of the Semantic Web solutions for Large-Scale Biomedical Data Analytics (SeWeBMeDA-2017), co-hosted with the ESWC 2017 conference, Portoroz, Slovenia.
- Reviewer of the Journal of Biomedical Semantics (2016-2017)
- Reviewer of the EU COST-Actions funding program (2016)
- Reviewer of the The French National Research Agency (ANR) program (2015-2016)
- Reviewer of the PLOS ONE Journal
- Session chair of “Pharma and Life Sciences” at the SEMANTiCS 2015, Vienna, Austria.
- Program Committee Member of the ACM Symposium on Applied Computing (SAC) - Technical track The Semantic Web and Applications (SWA) (2015-2017)

- Program Committee Member of the Semantic Web Applications and Tools for Life Sciences (SWAT4LS) (2015-2017)
- Reviewer of the Journal of Computers in Biology and Medicine, Elsevier, 2013
- Program Committee Member of the IEEE SMC 2013 - IEEE International Conference on Systems, Man, and Cybernetics (SMC 2013)
- Reviewer of the 2nd ACM SIGHT International Health Informatics Symposium (IHI 2012)
- Reviewer of the 6th International Conference on Semantic Systems (I-SEMANTICS 2010)
- Reviewer of the 3rd International Conference on Web Reasoning and Rule Systems (RR 2009)
- Reviewer of the 8th International Semantic Web Conference (ISWC 2009)
- Reviewer of the 16th European Conference on Information Systems (ECIS 2008)
- Reviewer of the 10th International Symposium on Practical Aspects of Declarative Languages (PADL 2008)
- Reviewer of the 9th IEEE International Conference on E-Commerce Technology (CEC-EEE 2007)
- Reviewer of the 6th International Conference of Ontologies, Databases, and Applications of Semantics (ODBASE 2007)

Publications

Book Chapters & Journals

- Alok Kumar Jha, Yasar Khan, Muntazir Mehdi, Md Rezaul Karim, Qaiser Mehmood, Achille Zappa, Dietrich Rebholz-Schuhmann and **Ratnesh Sahay: Towards precision medicine: discovering novel gynecological cancer biomarkers and pathways using linked data.** Journal of Biomedical Semantics 8(1), 40 (2017).
- Md Rezaul Karim, Audrey Michel, Achille Zappa, Pavel Baranov, **Ratnesh Sahay** and Dietrich Rebholz-Schuhmann: **Improving data workflow systems with cloud services and use of open data for bioinformatics research.** Briefings in Bioinformatics 16 (1), 39 2017.
- Athos Antoniadis, Aristos Aristodimou, Christos Georgousopoulos, Nikolaus Forg, Ann Gledson, Panagiotis Hasapis, Caroline Vandeleur, Konstantinos Perakis, **Ratnesh Sahay**, Muntazir Mehdi, Christiana A. Demetriou, Marie-Pierre F. Strippoli, Vasiliki Giotaki, Myrto Ioannidi, David Tian, Federica Tozzi, John Keane and Constantinos Pattichis: **Advancing clinical research by semantically interconnecting aggregated medical data information in a secure context.** Journal of Health and Technology, Special Issue on Systems Medicine, (1-18) 2017.
- Yasar Khan, Muhammed Saleem, Muntazir Mehdi, Aidan Hogan, Qaiser Mehmood, Dietrich Rebholz-Schuhmann, **Ratnesh Sahay: SAFE: SPARQL Federation over RDF Data Cubes with Access Control.** Journal of Biomedical Semantics 8(1), 5 (2017).
- Alok Kumar Jha, Yasar Khan, Dietrich Rebholz-Schuhmann and **Ratnesh Sahay: A linked data approach to discover HPV oncoproteins and RB1 induced mutation associations for the retinoblastoma research.** Journal of Cancer Research January 2017 (77) (2 Supplement)

- **Ratnesh Sahay**, Antoine Zimmermann, Ronan Fox, Axel Polleres and Manfred Hauswirth. **A Formal Investigation of Semantic Interoperability of Healthcare and Life Sciences (HCLS) Systems**. In Miguel-Angel Sicilia, Pablo Serrano-Balazote (ed.), *Interoperability in Healthcare Information Systems: Standards, Management, and Technology*. IGI Global, 2014

Conferences

- Yasar Khan, Antoine Zimmermann, Alok Kumar, Dietrich Rebholz-Schuhmann, **Ratnesh Sahay**: **Querying Web Polystores**. 2017 IEEE International Conference on Big Data (Big Data 2017), December 11-14, 2017, Boston, MA, USA.
- Muntazir Mehdi, Yasar Khan, Andre Freitas, Joao Bosco Jares, Saleem Raza, Panagiotis Hasapis, and **Ratnesh Sahay**. **A Linked Data Visualiser for Finite Element Biosimulations**. In proceedings of the tenth IEEE International Conference on Semantic Computing, California, USA.
- Muntazir Mehdi, Yasar Khan, Andre Freitas, Joao Bosco Jares, Saleem Raza, Panagiotis Hasapis, and **Ratnesh Sahay**. **Demonstrating A Linked Data Visualiser for Finite Element Biosimulations (Demo paper)**. In proceedings of the tenth IEEE International Conference on Semantic Computing, California, USA.
- Muntazir Mehdi, Yasar Khan, Joao Jares, Andr Freitas, Alok Kumar Jha, Antonis Sakellarios, **Ratnesh Sahay**: **A Linked Data Visualiser for Finite Element Biosimulations**. *Int. J. Semantic Computing* 10(2): 219-246 (2016).
- Alok Kumar Jha, Muntazir Mehdi, Yasar Khan, Qaiser Mehmood, Dietrich Rebholz-Schuhmann, **Ratnesh Sahay**: **Drug Dosage Balancing Using Large Scale Multi-Omics Datasets**. In proceedings of the 42st International Conference on Very Large Data Bases (VLDB), workshop on Data Management and Analytics for Medicine and Healthcare, New Delhi, India.
- Muntazir Mehdi, Yasar Khan, Andre Freitas, Joao Jares, Stefan Decker, and **Ratnesh Sahay**. **A Linked Data Platform for Finite Element Bio-Simulations..** In proceedings of the SEMANTiCS 2015, Vienna, Austria
- Muntazir Mehdi, Aftab Iqbal, Yasar Khan, Stefan Decker, and **Ratnesh Sahay**. **Detecting Inner-Ear Anatomical and Clinical Datasets in the Linked Open Data (LOD) Cloud**. In proceedings of the BDM2I, 14th International Semantic Web Conference (ISWC) 2015, Pennsylvania, USA
- Muntazir Mehdi, Yasar Khan, Andre Freitas, Joao Jares, Panagiotis Hasapis, and **Ratnesh Sahay**. **Detecting Inner-Ear Anatomical and Clinical Datasets in the Linked Open Data (LOD) Cloud**. In proceedings of the 14th International Semantic Web Conference (ISWC) 2015 (Demo Track), Pennsylvania, USA
- Yasar Khan, Muhammad Saleem, Aftab Iqbal, Muntazir Mehdi, Aidan Hogan, Panagiotis Hasapis, Axel-Cyrille Ngonga Ngomo, Stefan Decker, and **Ratnesh Sahay**. **SAFE: Policy Aware SPARQL Query Federation Over RDF Data Cubes**. In *Semantic Web Applications and Tools for the Life Sciences (SWAT4LS) 2014*, Berlin, Germany
- Alok Kumar Jha, Yasar Khan, Muntazir Mehdi, Aftab Iqbal, Achille Zappa, **Ratnesh Sahay**, Dietrich Rebholz-Schuhmann. **Linked Functional Annotation For Differentially Expressed Gene (DEG) Demonstrated using Illumina Body Map 2.0**. In proceedings of the Semantic Web Applications and Tools for Life Sciences (SWAT4LS) International Conference 2015, Cambridge, UK.

- Muntazir Mehdi, Yasar Khan, Andre Freitas, Joao Jares, Stefan Decker, and **Ratnesh Sahay**. **A Linked Data Platform for Finite Element Bio-Simulations**. In proceedings of the SEMANTiCS 2015, Vienna, Austria.
- Yasar Khan, Muntazir Mehdi, Alok Kumar Jha, Saleem Razaz, Andre Freitas, Marggie Jones, and **Ratnesh Sahay**. **Extending Inner-Ear Anatomical concepts in the Foundational Model of Anatomy (FMA) Ontology**. In proceedings of the 15th International Conference on Bioinformatics & Bioengineering (BIBE2015), 2-4 November 2015, Belgrade, Serbia.
- Andre Freitas, Kartik Asooja, Joao Jares, Stefan Decker, and **Ratnesh Sahay**. **A Semantic Web Platform for Improving the Automation and Reproducibility of Finite Element Bio-simulation..** In Semantic Web Applications and Tools for the Life Sciences (SWAT4LS) 2014, Berlin, Germany
- Muntazir Mehdi, Aftab Iqbal, Aidan Hogan, Ali Hasnain, Yasar Khan, Stefan Decker, **Ratnesh Sahay**. **Discovering Public SPARQL Endpoints: A Life-Sciences Use-Case..** In 18th International Database Engineering and Applications Symposium (IDEAS) , Porto, Portugal, 2014.
- Andre Freitas, Kartik Asooja, Swapnil Soni, Marggie Jones, Panagiotis Hasapis, **Ratnesh Sahay**. **Towards a Semantic Web Platform for Finite Element Simulations**. In 11th European Semantic Web Conference (ESWC), Springer LNCS Notes, Crete, Greece, 2014.
- Muntazir Mehdi, Aftab Iqbal, Ali Hasnain, Yasar Khan, Stefan Decker, and **Ratnesh Sahay**. **Utilizing Domain-Specific Keywords for Discovering Public SPARQL Endpoints: A Life-Sciences Use-Case**. In the ACM 29th Symposium On Applied Computing, The Semantic Web and Applications (SWA) Track, Gyeongju, Korea, 2014. (Short Paper)
- Christos Bellos, Athanasios Bibas, Dimitrios Kikidis, Steve Elliott, Stefan Stenfelt, **Ratnesh Sahay**, Konstantina Nikita, Dimitrios Koutsouris and Dimitrios I. Fotiadis. **SIFEM Project: Semantic Infrastructure interlinking an open source Finite Element tool and libraries with a model repository for the multi-scale Modelling of the inner-ear**. In 13th IEEE International Conference on Bioinformatics and BioEngineering (BIBE), Chania, Greece, 2013.
- Oya Deniz Beyan, Aftab Iqbal, Yasar Khan, Athos Antoniadis, John Keane, Panagiotis Hasapis, Christos Georgousopoulos, Myrto Ioannidi, Stefan Decker and **Ratnesh Sahay**. **Querying Phenotype-Genotype Associations across Multiple Knowledge Bases using Semantic Web Technologies**. In 13th IEEE International Conference on Bioinformatics and BioEngineering (BIBE), Chania, Greece, 2013.
- Andre Freitas, Margaret Jones, Kartik Asooja, Christos Bellos, Steve Elliott, Stefan Stenfelt, Panagiotis Hasapis, Christos Georgousopoulos, Torsten Marquardt, Nenad Filipovic, Stefan Decker and **Ratnesh Sahay**. **Towards a Semantic Representation for Multi-Scale Finite Element Biosimulation Experiments**. In 13th IEEE International Conference on Bioinformatics and BioEngineering (BIBE), Chania, Greece, 2013.
- Muntazir Mehdi, **Ratnesh Sahay**, Wassim Derguech and Edward Curry. **On-The-Fly Generation of Multidimensional Data Cubes for Web of Things**. In 17th International Database Engineering & Applications Symposium (IDEAS 2013), ACM Digital Library, Barcelona, Spain, 2013.
- **Ratnesh Sahay**, Dimitrios Ntalaperas, Eleni Kamateri, Panagiotis Hasapis, Oya Beyan, Marie-Pierre Strippoli, Christiana Demetriou, Thomai Gklarou-Stavropoulou, Mathias Brochhausen, Konstantinos Tarabanis, Thanassis Bouras, David Tian, Aristos Aristodimou, Athos Antoniadis, Christos Georgousopoulos, Manfred Hauswirth and Stefan Decker. **An Ontology for Clinical Trial**

Data Integration. In IEEE SMC 2013 - IEEE International Conference on Systems, Man, and Cybernetics, Manchester, UK, 2013.

- David Tian, Ann Gledson, Athos Antoniadis, Aristo Aristodimou, Ntalaperas Dimitrios, **Ratnesh Sahay**, Jianxin Pan, Stavros Stivaros, Goran Nenadic, Xiao-jun Zeng and John Keane. **A Bayesian Association Rule Mining Algorithm.** In IEEE SMC 2013 - IEEE International Conference on Systems, Man, and Cybernetics, Manchester, UK, 2013.
- Konstantinos Perakis, Thanasis Bouras, Dimitris Ntalaperas, Panagiotis Hasapis, Christos Georgousopoulos, **Ratnesh Sahay**, Oya Deniz Beyan, Cristi Potlog, and Daniela Usurelu. **Advancing Patient Record Safety and EHR Semantic Interoperability.** In IEEE SMC 2013 - IEEE International Conference on Systems, Man, and Cybernetics, Manchester, UK, 2013.
- **Ratnesh Sahay**, Ronan Fox, Antoine Zimmermann, Axel Polleres and Manfred Hauswirth. **A Methodological Approach for Ontologising and Aligning Health Level Seven (HL7) Applications.** In MISI 2011 - International Conference on Massive Information Sharing and Integration (MISI), Special Track on Electronic Healthcare, Vienna, Austria, 2011.
- Antoine Zimmermann, **Ratnesh Sahay**, Ronan Fox and Axel Polleres. **Heterogeneity and Context in Semantic-Web-Enabled HCLS Systems.** In ODBASE 2009 - 8th International Conference on Ontologies, DataBases, and Applications of Semantics (ODBASE), Vilamoura, Algarve, Portugal, 2009.
- **Ratnesh Sahay**, Ronan Fox and Manfred Hauswirth. **semantic Service-Oriented Design And Development Methodology For Enterprise Healthcare Integration.** In WEBIST 2009 - 5th International Conference on Web Information Systems and Technologies (WEBIST), Lisbon, Portugal, 2009.
- **Ratnesh Sahay**, Ronan Fox and Manfred Hauswirth. **Ontologising Interaction Behavior for Service-Oriented Enterprise Healthcare Integration.** In ECOWS 2008 - the 6th IEEE European Conference on Web Services (ECOWS), Dublin, Ireland, 2008.
- **Ronan Fox**, **Ratnesh Sahay** and Manfred Hauswirth. **PPEPR for Enterprise Healthcare Integration.** In eHealth 2008, City University, London EC1, 2008.
- **Ratnesh Sahay**, Waseem Akhtar and Ronan Fox. **PPEPR: Plug and Play Electronic Patient Records.** In ACM SAC 2008 - the 23rd Annual ACM Symposium on Applied Computing, the Semantic Web and Applications (SWA) track, Cear, Brazil, 2008

Selected Presentations, Meetings, Tutorials, and Invited Talks

- Tutorial on: **Biomedical Semantic Data Resources for Data Analytics and Knowledge Discovery** at the Semantic Web Applications and Tools for Life sciences (SWAT4LS) Conference, Rome, Italy, 2017
- Invited talk on: **Revealing Knowledge From Cancer and Biomedical Repositories** at the Language, Data and Knowledge (LDK) Conference, Galway, Ireland, 2017
- Invited talk on: **Ensuring Patient Privacy in Clinical Trials and Biomedical Research** at the Biobanking and BioMolecular Resources Research Infrastructure European Research Infrastructure Consortium (BBMRI-ERIC), Cork, Ireland, 2016
- Tutorial on: **Ontologising the Health Level Seven (HL7) Standard** at the International Workshop Semantic Web Applications and Tools for Life sciences (SWAT4LS), Berlin, Germany, 2014

- Invited talk on: **Linked2Safety: Ensuring Patient Safety in Clinical Trials** at the 25th European Medical Informatics Conference - MIE2014, Istanbul, Turkey, 2014
- Linked2Safety (project) presentation on: **Linked2Safety: Ensuring Patient Safety in Clinical Trials**, Brussels, Belgium, 2013
- Invited talk on: **Reuse of Patient Data in Clinical Research**, UK Clinical Research Facility Network Conference (UKCRFN), Dublin, Ireland, 2012
- Linked2Safety (project) presentation on: **Linked2Safety: Linked Medical Data Space**, Bucharest, Romania 2013
- SIFEM (project) presentation on: **SIFEM Finite Element Method for Bio Simulation Of Inner-Ear**, Athens, Greece 2013
- Linked2Safety (project) presentation on: **Linked2Safety: Linking LOD Life Sciences Data Sets**, Cyprus, 2012
- Linked2Safety (project) presentation on: **Linked2Safety: Query Federation Over Life Sciences Data Sets**, Larnaca, Cyprus, 2012
- Linked2Safety (project) presentation on: **Linked2Safety: Linking EHRs and Life Sciences Repositories**, Athens, Greece, 2011
- RIDE (project) presentation on: **A Roadmap for Interoperability of eHealth Systems**, Health Informatics Society of Ireland (HISI) Conference, 2007, Dublin, Ireland
- W3C **Web Ontology Language (OWL)** meeting, University of Manchester, United Kingdom (UK), 2007
- RIDE (project) presentation on: **A Roadmap for Interoperability of eHealth Systems in Support of COM 356 with Special Emphasis on Semantic Interoperability**, Geneva, Switzerland, September 2006

Programming/Technical Skill Set

- Language (Very good experience): Java, C++
- Language (Good with): C, ASP.NET stack, PHP, Eclipse rich client platform programming
- Operating System: Basic Linux/Unix server administrative skills
- Web sites and client-side scripting: HTML5, CSS3, JavaScript, AJAX, jQuery, Flash
- Source control repositories: Git, GitHub, SVN
- Database and Big Data: SQL, PLSQL, MongoDB, Hadoop
- Web Services: XML, WSDL, SOAP, BPEL2WS
- Semantic Web/Linked Data programming: RDF, SPARQL, JENA, OWL, Protege, Reasoners (Pellet, Hermit)

Languages

- English (fluently)
- Hindi (native)
- Swedish (very basic)