1025 Sherbrooke E. Apt. #303 Montreal H2L1L4, QC Canada (514) 623 1853 (mobile) http://duboue.ca/ pablo@duboue.ca pablo.duboue@gmail.com @pabloduboue PGP fingerprint: E4BC CF16 5D96 6290 849F FD87 C274 F6BF 4A27 AF6A

# Pablo Ariel Duboue, PhD

A lasting interest in human languages combined with strong programming skills and a passion for mathematics. Research accomplishments with both scientific and state-of-the-art human language technological contributions. Interests on AI, Computational Linguistics (NLP), Natural Language Generation, Question Answering and Machine Learning.

#### Education

Ph.D., Computer Science, Columbia University, Defended 1/17/05, Conferred 5/18/05
M.Phil., Computer Science, Columbia University, GPA 3.86/4, 2003
M.Sc., Computer Science, Columbia University, 2001
B.S., Computer Science, with honors, GPA 9.36/10, FaMAF-UNC, Argentina, 1998

#### **Research Experience**

Natural Language Generation, with FaMAF-UNC NLP Group

FaMAF-UNC, Argentina, 2010 -

Researching the impact of noisy, large scale datasets as inputs to NLG tasks. Information Retrieval, with the Recherche Appliqué en Linguistique Informatique Université de Montréal, Montreal, 2012–2013

Researching new methods for snippet extraction in Web search incorporating recent advances in text summarization.

Question Answering, with the Semantic Analysis and Infrastructure Dept.

IBM Watson Research Center, NY, 2005 – 2010

Pushed the boundaries of the state-of-the-art in language technologies working with world class scientists in a number of (mostly confidential) projects. Some projects with public visibility:

- DeepQA: Open Question Answering To Challenge Humans on America's Favorite Quiz Show, Jeopardy! Part of the team that started the scientific grand challenge expected to determine precise answers to complex questions at record speeds. Contributed at the sources, framework and machine learning / answer merging levels, among many others.
- GALE: Global Automatic Language Exploitation. Designed, developed and tested (as part of the GALE Go/No-Go evaluation 2007) a system that finds connections between events using pseudo documents representing the events.
- **TREC Enterprise Track: Expert Search.** Researched techniques to represent expertise by building pseudo-documents centered around a person of interest using multi-document summarization techniques. Showcased in TREC 2006.
- AQUAINT: Open Question Answering for Intelligence Analysis. Researched traditional, computation heavy techniques applied to Web data. Showcased in TREC 2005.

#### Learning Strategic Natural Language Generation Logic, with Prof. K.M. McKeown

Columbia University, NY, 2000 - 2004

Developed a novel approach integrating semantics and machine learning for a variety of language tasks, including generation and question answering. Contribution consists in learning to select facts for presentation in a text, learning to order the aforementioned facts, and combining statistical and symbolic techniques for the previous learning problems. Applied in the following projects:

- AQUAINT: Open Question Answering for Intelligence Analysis. Designed and developed an integrated system that extracts pieces of information about a person from Web pages and assembles a new (unseen) biography from them (50000 lines of Java). Funded by ARDA, the intelligence community (CIA, DIA, etc.) funding agency.
- MAGIC: Multimedia Automated Generation for Intensive Care. Learned the high level presentation planner for a system producing post cardiac by-pass surgery reports. Worked closely with medical specialists and managed, debugged and stabilized a 24000 lines of Lisp system, developed by former members of the project. Funded by NIH/NLM.

#### Word Sense Disambiguation for Genomics Text Mining, with Dr. V. Hatzivassiloglu Columbia University, NY, 1999 – 2000

Targeted the highly ambiguous case of gene/protein/mRNA name occurrence in molecular biology texts. Developed unsupervised Word Sense Disambiguation trainable methods that rivaled biology experts performance in the task.

#### Lexical Functional Grammars and Lazy Functional Languages, with Dr. J. Blanco FaMAF-UNC, Argentina, 1998 – 1999

Researched a formalism that transforms Spanish utterances into executable Haskell code. The approach was exemplified with a filesystem manipulation interface.

## Models and Simulations for E-commerce, with Eng. D. Blank

UES21, Argentina, 1998 – 1999

Developed D-Tree, an interpreter (2600 lines of Concurrent Clean) for discrete simulations where the logic for each agent was expressed as a decision tree.

#### **Professional Experience**

2015	<b>Co-Founder and VP of Research.</b> Erudite Science Inc., design and devel- opment intelligent tutoring systems for math education.
2015	<b>Chief Science.</b> KeaText Inc., design and development of complex NLP pipelines in the Voice-of-the-Customer domain.
2014	<b>Research Engineer.</b> PasswordBox Inc. (then Intel Security), design and de- velopment of machine learning applied to prediction of behavior in Rich Internet Applications.
2013	<b>Co-Founder and CTO.</b> stylist.jolietta.com (defunct), a stealth-mode startup in full-outfit fashion recommendation.
2013	<b>Research Engineer.</b> KeaText Inc., design and development of complex Information Extraction pipelines in the real state and legal domains
2012-	<b>Principal.</b> Consulting services targeting R+D for startups operating as <i>Pablo Duboue Services Professionnels</i> . Clients included MatchFWD (recruitement), UrbanOrca (dating/friendship) and Radialpoint (technical support).

- 2011 Co-Founder and CTO. Cantoura, Inc., a start-up focusing on Augmented Reality for the Canadian market. Its flagship product won the Ottawa Open Data competition.
- 2005-2010 Research Staff Member. IBM T.J. Watson Research Center, Semantic Analysis and Infrastructure Dept. Worked in 6+ projects including joint projects with overseas teams in China and Israel. Involvement with complex NLP frameworks, particularly UIMA.
- 1999-2004 Graduate Research Assistant. Columbia University NLP Group. Worked in 3 different projects with multidisciplinary teams including computer scientists, medical doctors, biologists, computer graphic specialists and linguists. Significant exposure to government funding dynamics.
- Summer 2000 Research Developer. Summer internship, IBM T.J. Watson Research Center, Conversational Machines group, developed a tool for grammar revision, 10000+ lines of Java implementing a published patent including an Early parser, a Swing GUI and access to VoiceXML grammars.
- 1997-1998 Web and Multimedia Developer. NC Editorial S.R.L. Design, programming and management of projects including a city information system (3000+ lines of Delphi) and multimedia kiosks running promotional video games.
- Summer 1997 Sysadmin. Internship, Architecture School. Installation of new UNIX and Linux servers. Localization to Spanish of main functionality of mail reader program 'pine' from University of Washington.
- Fall 1995 Developer. QPlus Consultores S.R.L. Simulation and modeling software, Statistics module (complex SQL statements joining multiple tables) and Print managing modules (including checks printing). 5000 lines of Visual Basic.

#### **Teaching Experience**

Advisor

2011-2012	Supervised undergraduate thesis student Daniel Bridera (joint w/Lic. Dominguez) Topic: Template Induction for Natural Language Generation, FaMAF-UNC.
2011-2012	Supervised undergraduate thesis student Fabián Pacheco (joint w/Lic. Dominguez) Topic: Large Scale Eval of Referring Expression Generators, FaMAF-UNC.
2002-2004	Supervised undergraduate thesis student Paula Estrella (joint w/Dr. Bustos) Topic: Machine Translation for E-Commerce, FaMAF-UNC.
2001-2002	Supervised undergraduate thesis student Jimena Costa (joint w/Dr. Tamarit) Topic: Encoding Semantic Networks by Symbol Recirculation, FaMAF-UNC.
1999-2001	Supervised undergraduate thesis student Jose Norte Topic: State Senate IS: Effective Communication with NGOs, UES21.
2000-2005	Supervised 5+ undergraduate research project students, as part of the CU Project Liasion that let undergraduates pursue research projects for credit

### Instructor

		Instructor
Spring 2011	Visiting Lecturer, <i>Machine Learning over Large Datasets</i> , (Graduate course, semester long) Facultad de Matematica Astronomia y Fisica (FaMAF-UNC), Argentina	
Fall 2014	Visiting Lecturer, Introduction to Natural Language Generation, (Graduate course, semester long) Facultad de Matematica Astronomia y Fisica (FaMAF-UNC), Argentina	
Fall 2001	Instructor, Data Structures in Java, Columbia University	
Summer 2001	Instructor, Algorithms & Data Structures in Java, Columbia University	
1998-1999	Instructor, Operating Systems, Programming $(C++ \text{ and } Java)$ , Universidad Empresarial Siglo 21, Córdoba, Argentina	
		Teaching
Fall 2003	TA, Video Game Technology And Design (Prof. B. Yee and D. Sturmann)	Assistant
Summer 2002	TA, Artificial Intelligence (Prof. A. Kosoresow), Columbia University	
Spring 2001	TA, Computational Genomics (Prof. W. Noble), Columbia University	
1996-1999	TA, Operating Systems, Discrete Mathematics, Software Engineering, Facultad de Matematica Astronomia y Fisica (FaMAF-UNC), Argentina	

### Volunteer Activities

2014	Data Science Cordoba meetup founder and organizer.
2014	NaturalNode Free software project (NLP tools for node.js). Committer.
2013	Poisson Magique Free software project. Founder. http://poisson magique.net
2013	$Thought land \ Free \ software \ project. \ Founder. \ http://thought land.duboue.net$
2012	$Keywords  for \ by tecodes \ Free \ software \ project. \ Founder. \ http://keywords4by tecodes.org$
2012-2013	24 pull requests challenge. Finished 24 small Free software contributions during December.
2011	Listoso Mailing list translation site. Founder. http://listoso.com
2010-present	Full voting member at Les Laboratoires Foulab, Montreal premier hackerspace.
2009-present	Debian GNU/Linux contributor. Contributing to the Debian Conference local- team for fundraising and the Debian Java maintainers team.
2009-2010	NY Linux User Group. Corporate sponsor liason.
2005-2007	IBM Latin Diversity Club. Volunteered in activities promoting minority pri- mary school children into pursuing a career in sciences and engineering.
2000-2004	Columbia University, volunteer duties: sysadmin for the NLP group, departmental photographer ('00-'02) and webmaster ('03)

2001-2004	Volunteered in a number of conferences, including HLT-NAACL 2004 (Webmaster), WWW 2004 (A/V), INLG 2002 (local arrangements), ACL 2002 (A/V), NAACL 2001 (A/V)
1996	Student representative at FaMAF-UNC Directive Board (voice and vote, year-long, student-elected position)

# Undergraduate Education

1998	Undergraduate thesis the Development of a Functional Parser for the Spanish Language (advisor: Dr. Blanco). Written in Haskell, including a Web UI.
1987-1993	Attended Colegio Nacional de Monserrat high school, courses included Latin (5 yrs.), Ancient Greek (3 yrs.), <b>French (5 yrs.)</b> and Italian (3 yrs.)

### Achievements

2014	Best Technical Paper Award, Canadian AI Conference, for <i>Filtering Personal Queries from Mixed-Use Query Logs</i> .	
2006	IBM Long Term Incentive Award	
2005	IBM Long Term Incentive Award	
1999	Top 1% GRE Subject (Computer Science), $890/900$	
1999	Awarded Córdoba University Prize (equiv. to a with honors qualification)	
1998	Selected as the School's flag escort (Computer Science best GPA)	
1995	National college-level math competition $\it Ernesto$ $\it Paenza,$ ranked 11th best (teaming w/A. Andrada)	
1988-1993	High-school level Argentine math olympiad, qualified for the nationals for five years in a row. Ranked 4th best at the 1993 national	
Publications		Patents
2014	System and Method of Expanding a Search Query, P.A. Duboue, A Smirnov (disclosed).	
2014	Method of Naming Query Clusters, A Smirnov, P.A. Duboue, A.F. Bressane Neto (disclosed).	
	Neto (disclosed).	
2010	Providing question and answers with deferred type evaluation using text with limited structure, P.A. Duboue, J. Fan, D. Ferrucci, J.W. Murdock, C. Welty, W. Zadrozny, U.S. Patent Application US20120330934 A1.	

### Journals

2012	A Framework for Merging and Ranking of Answers in DeepQA, D. Gondek, A. Lally, A. Kalyanpur, J. W. Murdock, P.A. Duboue, L. Zhang, Y. Pan, Z. M. Qiu and C. Welty, IBM Journal of R&D, Vol. 56, Issue 3.4, 14:1 - 14:12.	
2004	GeneWays: A System for Extracting, Analyzing, Visualizing, and Integrating Molecular Pathway Data, A. Rzhetsky, I. Iossifov, T. Koike, M. Krauthammer, P. Kra, M. Morris, H. Yu, P.A. Duboue, W. Weng, J. Wilbur, V. Hatzivas- siloglou, and C. Friedman, Biomedical Informatics, Vol. 37, No. 1, Feb.	
2001	Disambiguating Proteins, Genes, and RNA in Text: A Machine Learning Approach, V. Hatzivassiloglou, P.A. Duboue and A. Rzhetsky, Bioinformatics 17 Suppl 1:S97-106, PubMedID: 11472998.	
		Conferences
2014	Filtering Personal Queries from Mixed-Use Query Logs. A.F. Bressane Neto, P. Desaulniers, P.A. Duboue, A. Smirnov. 27th Canadian Conference on Artificial Intelligence (also LNCS $\#8436$ ), Montreal, Canada.	
2012	Bridging the Gap between Intrinsic and Perceived Relevance in Snippet Gen- eration. J. He, P.A. Duboue, JY. Nie. 24th International Conference on Computational Linguistics (COLING), Mumbai, India.	
2012	Extractive email thread summarization: Can we do better than He Said She Said? P.A. Duboue. International Natural Language Generation Conference (INLG), Starved Rock, IL.	
2006	Improving QA Accuracy by Question Inversion, J.M. Prager, P.A. Duboue, J. Chu-Carroll, Annual Meeting of the Association for Computational Linguistics (ACL), Sydney, Australia.	
2006	Semantic Search via XML Fragments: A High-Precion Approach to IR, J. Chu- Carroll, J.M. Prager, K. Czuba, D. Ferruci, P.A. Duboue, Annual ACM Confer- ence on Research and Development in Information Retrieval (SIGIR), Seattle, WA.	
2004	Indirect Supervised Learning of Content Selection Rules, P.A. Duboue, Interna- tional Natural Language Generation Conference (INLG), New Forest, UK.	
2003	Statistical Acquisition of Content Selection Rules for Natural Language Gen- eration, P.A. Duboue, K.R. McKeown, Conference on Empirical Methods in Natural Language Processing ( <b>EMNLP</b> ), Sapporo, Japan.	
2002	Content Planner Construction via Evolutionary Algorithms and a Corpus-based Fitness Function, P.A. Duboue, K.R. McKeown, International Natural Lan- guage Generation Conference ( <b>INLG</b> ), Ramapo Mountains, NY.	
2001	Empirically Estimating Order Constraints for Content Planning in Generation, P.A. Duboue and K.R. McKeown, Annual Meeting of the Association for Com- putational Linguistics (ACL), Toulouse, France.	

2013	Hunter Gatherer: UdeM at 1Click-2. P.A. Duboue, J. He, JY. Nie. Proceed- ings of the 10th NTCIR Conference, Tokyo, Japan.
2013	On the Feasibility of Automatically Describing n-dimensional Objects. P.A. Duboue. Proceedings of the 14th European Workshop on Natural Language Generation, Sofia, Bulgaria.
2013	Thoughtland: Natural Language Descriptions for Machine Learning n-dimensional Error Functions (demo). P.A. Duboue. Proceedings of the 14th European Workshop on Natural Language Generation, Sofia, Bulgaria.
2012	On The Feasibility of Open Domain Referring Expression Generation Using Large Scale Folksonomies, F. Pacheco, P.A. Duboue, M. Dominguez. NAACL- HLT Short Papers, Montreal, QC.
2011	The GIVE-2.5 C Generation System, D. Racca, L. Benotti, P. Duboue. EWNLG, GIVE Evaluation Challenge, Nancy, France.
2009	Towards the Open Advancement of Question Answering Systems, D. Ferrucci, E. Nyberg, J. Allen, K. Barker, E. Brown, J. Chu-Carroll, A. Ciccolo, P. Duboue, J. Fan, D. Gondek, E. Hovy, B. Katz, A. Lally, M. McCord, P. Morarescu, J.W. Murdock, B. Porter, J. Prager, T. Strzalkowski, C. Welty, W. Zadrozny, Hawhtorne, NY, also IBM Research Report RC24789.
2006	Answering the question you wish they had asked: The impact of paraphrasing for Question Answering, P.A. Duboue, J. Chu-Carroll. HLT-NAACL Short Papers, New York, NY.
2006	<i>IBM in TREC 2006 Enterprise Track,</i> J. Chu-Carroll, G. Averboch, P.A. Duboue, D. Gondek, J.W. Murdock, J.M. Prager, Text REtrieval Conference ( <b>TREC</b> ), Gaithersburg, MD.
2005	<i>IBM's PIQUANT II in TREC2005,</i> J. Chu-Carroll, K. Czuba, P.A. Duboue, J.M. Prager, Text REtrieval Conference ( <b>TREC</b> ), Gaithersburg, MD.
2005	Experiments on Language Normalization for Spanish to English Machine Trans- lation, P. Estrella, P.A. Duboue, Revista Iberoamericana de Inteligencia Artifi- cial.
2004	Distributed Ontological Encoding Through Symbol Recirculation, M.J. Costa and P.A. Duboue, Argentine Symp. on Artif. Int. (ASAI).
2003	ProGenIE: Biographical descriptions for Intelligence Analysis, P.A. Duboue, K.R. McKeown and V. Hatzivassiloglou, NSF/NIJ Symposium on Intelligence and Security Informatics (ISI), Tucson, AZ.
2002	Building a Foundation System for Producing Short Answers to Factual Ques- tions, S. Pradhan, G. Illouz, S. Blair-Goldensohn, A. Schlaikjer, V. Krugler, E. Filatova, P.A. Duboue, H. Yu, R. Passonneau, S. Bethard, V. Hatzivas- siloglou, W. Ward, D. Jurafsky, K.R. McKeown, J. Martin, Text REtrieval Conference ( <b>TREC</b> ), Gaithersburg, MD.

2001	Poster Re-engineerig an Inference Engine to Support Continuous Quality Im- provement, P.A. Duboue, D. Jordan and K.R. McKeown, Annual Symposium of the American Association of Medical Informatics (AMIA).
1999	Using Lexical Functional Grammars for Natural Language Systems, J. Blanco and P.A. Duboue, Argentine Symp. on Artif. Int. (ASAI), B. Aires, Argentina.
1999	A Functional and Lexical Parser, J. Blanco and P.A. Duboue, Latinoamerican Conference in Functional Languages (CLAPF), Recife, Brasil.
1999	<i>ObjectDtree: A Simulation Tool for Business-like Scenarios</i> , D. Blank and P.A. Duboue, Argentine Symp. of Model and Simulation, B. Aires Argentina.
1996	Desarrollo de un Generador de Simulaciones Dinámicas por Especificaciones Visuales, D. Blank, N. Bruno, and P.A. Duboue, IX Computer Applications International Symposium ( <b>INFONOR</b> ), Antofagasta, Chile.

# Talks

Feb 2015	NLG for Statistical Reports, Mtl Data meetup, Montreal, QC.
Sep 2014	Apache UIMA y el Sistema Watson Jeopardy!, Córdoba TechDay, Córdoba, Argentina.
Aug 2014	<i>El Hackerspace como Santuario de la Cultura Friki</i> , Frikiloquio 2014, Buenos Aires, Argentina.
Mar 2014	Apache UIMA y el Sistema Watson Jeopardy!, Universidad Tecnológica Na- cional, Córdoba, Argentina.
Feb 2014	Apache UIMA and the Watson Jeopardy! System, Montreal Big Data meetup, Montreal, QC.
Dec 2013	Poisson Magique project et introductión à le cadre de logiciel "Lamson", Mon- treal Python meetup, Montreal, QC.
Aug 2013	Machine learning for hackers and why it matters for Free Software, Observe, Hack, Make hackercamp, Oudkarspel, Netherlands.
Aug 2013	24 pull requests: what/how/why (lighting talk), Observe, Hack, Make hacker- camp, Oudkarspel, Netherlands.
Aug 2013	Machine Learning in Javascript (lighting talk), Observe, Hack, Make hacker- camp, Oudkarspel, Netherlands.
Aug 2013	Thout: a javascript distributed content system (lighting talk), Observe, Hack, Make hackercamp, Oudkarspel, Netherlands.
Feb 2013	Hunter-Gatherer, a 1-Click Summarizer, Montreal Python meetup, Montreal, QC.
Jul 2012	Machine learning threats and opportunities for Debian and Free Software, De- bConf12, Managua, Nicaragua.

Jul 2012	Reigning over high-volume Debian e-mails, DebConf12, Managua, Nicaragua.
Jun 2012	Predicting English keywords from Java Bytecodes using Machine Learning, Re- con 2012, Montreal, QC.
Jun 2012	Panel on commercial applications of NLG, INLG 2012, Starved Rock, IL.
Feb 2012	Computer Science in the times of high error rate: survival tips from the NLP trenches, Graduate Students Seminar Series, McGill Computer Science Dept.
Nov 2011	NLG using PHP, DevCamp Montreal, Montreal, QC.
Oct 2011	$Expériences\ de\ génération\ de\ langage\ avec\ PD,\ pdmtl\#44,\ Montreal,\ QC.$
Jun 2011	Un egresado de la FaMAF en el Jeopardy!/IBM Challenge, FaMAF-UNC, Cór- doba, Argentina.
Apr 2011	$NLG\ Opportunities\ in\ FLOSS,$ Workshop NLG FaMAF-UNC, Córdoba, Argentina.
Apr 2011	Introducción al Procesamiento de Lenguaje Natural con NLTK, (Joint talk with Rafael Carrascosa from FaMAF-UNC), PyDay Córdoba, UTNRC, Argentina.
Jan 2011	Introduction to the Natural Language Toolkit, Montreal Python meetup, Montreal, QC.
Dec 2010	Apache UIMA and Academic Research, Grupo de PLN FaMAF, Córdoba, Ar- gentina.
Aug 2010	A Battle Cry for a System-level JVM in Debian, DebConf10, New York, NY.
Aug 2010	What if we could automatically test our textual instructions? DebConf10, New York, NY.
Mar 2010	How do Free Software ideals relate to Cloud Services? (Joint talk with Richard Darst from Debian-NYC), BarCampNYC5, New York, NY.
Feb 2010	Unstructured Information Processing with Apache UIMA, NYC Search and Discovery Meetup, New York, NY.
May 2009	Natural Language Generation Tutorial, BarCamp NYC, New York, NY.

Nov 2006	Computadoras, idiomas, gobiernos y fuentes laborales, Jornadas de Ciencia y Sociedad a los 50 Años de FaMAF, Córdoba, Argentina.
Sep 2004	Indirect Supervised Learning of Content Selection Rules, ICCS/HCRC Seminar, University of Edinburgh, UK.
Sep 2004	Indirect Supervised Learning of Content Selection Rules, ITRI, University of Brighton, UK.
Sep 2004	Indirect Supervised Learning of Content Selection Rules, Language Computer Corp., Dallas, TX.
Aug 2004	Indirect Supervised Learning of Content Selection Rules, BBN Technologies, Cambridge, MA.
Aug 2004	Indirect Supervised Learning of Content Selection Rules, University of Maryland (for Army Research Lab), College Park, MD.
Jul 2004	Indirect Supervised Learning of Content Selection Rules, Cambridge NLP group, Cambridge, UK.
Jun 2004	Indirect Supervised Learning of Content Selection Rules, NYU NLP group, New York, NY.
Apr 2004	Indirect Supervised Learning of Content Selection Rules, AT&T Labs – Research, Florham Park, NJ.
Jun 2003	L'Apprenant de Schemas pour la Structuration Rhétorique du Génération Au- tomatique du Textes, LIMSI, Orsai, France.
Aug 2002	Learning for Content Planning in Generation, FaMAF-UNC, Córdoba, Argentina.
Aug 2002	Word Sense Disambiguation in Molecular Biology Texts, FaMAF-UNC, Córdoba, Argentina.
Oct 2000	Word Sense Disambiguation in Molecular Biology Texts, IBM Open House, IBM T.J. Watson Research Center, Hawthorne, NY.
May 2000	Word Sense Disambiguation in Molecular Biology Texts, Universidad Empre- sarial Siglo 21, Córdoba, Argentina.
Mar 1999	Simulación de entornos transacionales distribuidos, jointly with Eng. D. Blank, Internet World Córdoba '99, Córdoba, Argentina.
Nov 1998	<i>Tutorial en Comercio Electrónico</i> , XI Computer's Panel, Universidad Nacional de Asunción, Paraguay.

# Skills

Languages Spanish (mother tongue), English, French, Portuguese, Italian (basic), Chinese Mandarin (beginner), American Sign Language (basic)