Dr. Victoria A. Stuart, Ph.D.

Vancouver, British Columbia, Canada
(604) 628-9609 | Victoria.A.Stuart@gmail.com
Web: http://Persagen.com | http://PPMsearch.com

PERSONAL STATEMENT

My **mission** is to seek collaborative solutions to scientific and societal issues, addressing my **vision** of applying science and technology to the betterment of human health.

Among my long-term, "overarching" **goals** are the advancement of knowledge in functional genomics: the phenotypic and functional expression of the information contained within genomes. In pursuit of this objective – building on a thorough grounding in biochemistry and molecular genetics – in recent years my scientific and intellectual interests have actively expanded to include informatics and computational methods – including their broader application (e.g. to knowledge discovery, reasoning and cognitive computing).

The intersection of these core domains (genomics; programming; machine learning; natural language processing; knowledge stores; relational data; ...) enables a better understanding of functional and conceptual interactions, naturally leading to translational knowledge discovery that transcends dogmatic boundaries.

EDUCATION

Ph.D., Biology Jun 2000

University of Victoria, Victoria, British Columbia, Canada
Specialization: Molecular Genetics: Mechanisms of Mutagenesis & Carcinogenesis
Dissertation: "Influences of Ageing and Diet on Mutational Frequency and Specificity in Big Blue® *lacI* Transgenic Rodents"

M.Sc., Occupational Hygiene May 1995

Occupational Hygiene Programme
[*now the School of Environmental Health*]
University of British Columbia, Vancouver, British Columbia, Canada
Specialization: Molecular Epidemiology
Thesis: "Genotoxicity of Captan Measured in the Comet Assay"

B.Sc. with Honours, Biochemistry Oct 1983

Dalhousie University, Halifax, Nova Scotia, Canada
Minor: Chemistry
Honours Thesis: "Dimroth Rearrangement of the Oligodeoxyribonucleotide Synthesis Precursor N^6-Benzoyl-Deoxyadenosine"

CURRENT POSITION

Owner, Persagen.com
Owner, PPMSearch.com Jun 2009 - Present

Providing scientific expertise/solutions in the areas of molecular genetics/genomics, cancer biology, human and environmental health, bioinformatics, clinical genetics/health, computational biology, knowledge discovery, natural language processing including machine learning/cognitive computing, and scientific/peer review.

RECENT AFFILIATIONS

Owner, Persagen Consulting Jun 2009 - Present
(ad hoc: Jan 2014 - Aug 2015)

I've been self-employed since June 2009 as a Scientific Consultant, providing scientific expertise in molecular genetics, genomics, molecular biology, other life sciences, bioinformatics and

scientific review. From 2009 - 2013 I was subcontracted to Battelle Memorial Institute, Chapel Hill, N.C., providing scientific expertise and review for the U.S. Army Research Office (ARO; Durham, N.C.), and the U.S. Army Center for Environmental Health Research (USACEHR; Washington, D.C.).

Computational Biologist Jan 2014 - Aug 2015

Canada's Michael Smith Genome Sciences Centre, British Columbia Cancer Agency, Suite 100, 570 W. 7th Ave., Vancouver, British Columbia. V5Z 4S6.

Research Scientist May 2001 - Nov 2008

Laboratory of Molecular Genetics
[*now the Genome Integrity and Structural Biology Laboratory*]
National Institute of Environmental Health Sciences
P.O. Box 12233, MD E3-01, Research Triangle Park, North Carolina 27709.

Throughout this period support was provided by the **U.S. Army Research Office** (Research Triangle Park, Durham, North Carolina), through:

- **Research Associateship Award** May 2005 - Nov 2008
  National Academy of Sciences, Washington, D.C.
- **Research Assistant** May 2002 - Apr 2005
  Department of Molecular Genetics and Microbiology
  Duke University Medical Center, Durham, North Carolina
- **International Research Scholar** May 2001 - Apr 2002
  Department of Microbiology
  North Carolina State University, Raleigh, North Carolina

SCIENTIFIC INTERESTS

With formal training and 30+ years research experience in genomics and molecular genetics, I possess supra Ph.D.-level domain expertise in biology, biochemistry, bioinformatics, cancer biology and genomics, cellular signaling and metabolic pathways, DNA metabolism, etc.

Molecular Biology:
- all basic: cloning...
- transgenic rodent models
- mitochondrial genetics
- DNA sequencing, analysis

Microbiology:
- yeast genetics
- bacterial genetics
- strain construction
- mutational assays

Genetics/Genomics:
- functional genomics
- molecular genetics
- oncogenomics
- pathways/networks

Those experiences, combined with my natural curiosity on the nature of "information" (e.g., as encoded in DNA) and knowledge discovery, have led me to acquire and develop expertise in artificial intelligence, machine learning (including deep learning), and cognitive computing.

I am especially motivated by the application (variously) of AI/ML models, graphical models, knowledge stores, deep neural nets, natural language processing (NLP), etc. to real-world problems (biology, genomics, business, societal issues, knowledge discovery), as well as exploring research directions in cognitive computing: the ability of machines to reason over data.

My most recent work (Jan 2014 - present) predominantly revolves around:

Artificial Intelligence:
- cognitive computing
- reasoning
- question-answering
- NLP

Machine Learning:
- dimensionality
- deep neural nets (CNN, RNN, ...)
- vector space models

Knowledge-Related:
- metadata
- graphical models
- knowledge graphs
- triplestores; relational data

EXPERIENCE & SKILLS

Languages & Software: (GNU) Bash/scripts, LaTeX, GNU Octave, Java, Julia, Python, R

Libraries: Carrot2, Keras, scikit-learn, Theano, TensorFlow

Platforms: Anaconda, command-line, IntelliJ IDEA, Jupyter (iPython), RStudio, Solr

Operating Systems: Linux

LEADERSHIP & SCIENTIFIC SERVICE

Genetics and Environmental Mutagenesis Society, Durham N.C. 2002 - 2007

- **President** 2006 - 2007
- **President-Elect** 2005 - 2006
- **Councilor** 2002 - 200

Founder, AI-SIG 2014

Artificial Intelligence & Machine Learning Special Interest Group

Peer Review, Academic Journals: Acta Biochimica et Biophysica Sinica; Archives of Biochemistry and Biophysics; Cancer Letters; Environmental and Molecular Mutagenesis; Eukaryotic Cell; Functional and Integrative Genomics; Genetics; Molecular and Cellular Biology; Mutagenesis; Mutation Research; NIEHS internal reviews; Proceedings of the National Academy of Sciences of the United States of America

Scientific Review: Expertise in peer review of scientific research proposals, with hundreds (>230) of leading-edge academic genetics, genomics and life sciences proposals reviewed, ranging from US$50K - US$16M.

Project Leader 2000 – 2001

Supervision of graduate students in: Individual Susceptibility Group, Centre for Environmental Health, Department of Biology, University of Victoria

Leadership - Extracurricular:

- **President** 1985 – 1986
  Phi Kappa Pi Fraternity, Dalhousie University, Halifax, Nova Scotia, Canada
- **Founder** April 2008
  Durham Gender Alliance.Durham, N.C. USA
  http://groups.yahoo.com/group/durhamgenderalliance
- **Chair** Feb 2009 - Jun 2009
  Trans Alliance Society, Vancouver, B.C.

MENTORING & TEACHING

Co-Op Student Supervisor 2014 - present
B.C. Genome Sciences Centre. Various supervisory & administrative tasks

Mentor, "Women in Science" 2014 - present
University of British Columbia: http://ubcwomeninscience.wordpress.com

Mentor, "Women in Science and Engineering:" 2012 - 2014
University of British Columbia: Annual WiSE event

Teaching:

- Co-Lecturer — Spring 2001; Spring 2000
  Biology 437/550E, DNA Repair and Mutagenesis, University of Victoria
- Co-Lecturer & Course Coordinator /Administrator — Winter 2000
  Biology 439/550E, Molecular Epidemiology, University of Victoria
- Supervisor — 1997 - 2001
  Supervision & training of undergraduate summer students & technicians
  Department of Biology, University of Victoria
- Laboratory Instructor — 1983
  Biochemistry Laboratory, Dalhousie University

HONORS & AWARDS

National Research Council Research Associateship Award — 2005 - 2008
National Academies, Washington D.C.

National Cancer Institute of Canada (NCIC) Student Travel Award — 1999

Environmental Mutagen Society Student Travel Award — 1997

Foundation for the Promotion of Cancer Research — 1996
Fellowship for Research in Japan
National Cancer Center Research Institute, Tokyo, Japan

Graduate Student Stipend — 1995 - 1999
Cancer Research Society Inc., Montreal, Canada

Undergraduate Summer Research Fellowship — 1981; 1982
Natural Sciences and Engineering Research Council, Ottawa, Canada

INVITED TALKS, LECTURES

Natural Language Laboratory — Apr 09, 2014
Simon Fraser University, Burnaby, B.C.
"Biomedical Text Mining/Artificial Intelligence Applied to Clinical Reporting"

University of Victoria Sustainability Project — Mar 29, 2000
University of Victoria, Victoria, B.C.
"Genetic Studies of Dietary and Environmental Mutagens and Carcinogens Using *lacI* Transgenic Rodents"

Occupational Hygiene Programme — Feb 05, 1999
University of British Columbia, Vancouver, B.C.
"Genetic Studies of Dietary and Environmental Mutagens and Carcinogens Using *lacI* Transgenic Rodents"

Carcinogenesis Division, NCCRI — Jan 18, 1996
National Cancer Center Research Institute, Tokyo, Japan
"A study of *Tris*(2,3-dibromopropyl)-phosphate in Big Blue® transgenic mice, and aflatoxin B_1 in Big Blue® mice and rats"

PEER-REVIEWED PUBLICATIONS

Citations (Google Scholar): http://scholar.google.com/citations?user=VictoriaStuart

Published Papers

Stuart, G.R., Copeland, W.C. and Strand, M.K. (2009) "Construction and Application of a Protein and Genetic Interaction Network (Yeast Interactome)" Nucleic Acids Research 37, e54.

Stuart, G.R., Humble, M.M., Strand, M.K. and Copeland, W.C. (2009) "Transcriptional Response to Mitochondrial NADH Kinase Deficiency in *Saccharomyces cerevisiae*." Mitochondrion 9, 211-221.

Stuart, G.R., Santos, J.H., Strand, M.K., Van Houten, B. and Copeland, W.C. (2006) "Mitochondrial and nuclear DNA defects in *Saccharomyces cerevisiae* with mutations in DNA polymerase γ associated with progressive external ophthalmoplegia." Human Molecular Genetics 15, 363-374.

Thornton, A.S., Oda, Y., **Stuart, G.R.**, Holcroft, J. and de Boer, J.G. (2004) "The dioxin TCDD protects against aflatoxin-induced mutation in female rats, but not in male rats." Mutation Research 561, 147-152.

Strand, M.K., **Stuart, G.R.**, Longley, M.J., Graziewicz, M.A., Dominick, O.C. and Copeland, W.C. (2003) "*POS5* Gene of *Saccharomyces cerevisiae* encodes a mitochondrial NADH kinase required for stability of mitochondrial DNA." Eukaryotic Cell 2, 809-820.

Yang, H., **Stuart, G.R.**, Glickman, B.W. and de Boer, J.G. (2001) Modulation of 2-amino-1-methyl-6-phenylimidazo[4,5-*b*]pyridine-induced mutation in the cecum and colon of Big Blue® rats by conjugated linoleic acid and 1,2-dithiole-3-thione. Nutrition and Cancer 39, 259-266.

Stuart, G.R., de Boer, J.G., Haesevoets, R., Holcroft, J., Kangas, J., Sojonky, K., Thorleifson, E., Thornton, A., Walsh, D.F., Yang, H. and Glickman, B.W. (2001) Mutations induced by 2-amino-1-methyl-6-phenylimidazo [4,5-*b*]pyridine (PhIP) in cecum and proximal and distal colon of *lacI* transgenic rats. Mutagenesis 16, 431-437.

Thornton, A.S., Oda, Y., **Stuart, G.R.**, Glickman, B.W. and de Boer, J.G. (2001) Mutagenicity of TCDD in Big Blue® transgenic rats. Mutation Research 478, 45-50.

Stuart, G.R., Holcroft, J., de Boer, J.G. and Glickman, B.W. (2000) Prostate mutations in rats induced by the suspected human carcinogen 2-amino-1-methyl-6-phenyl-imidazo[4,5-*b*]pyridine. Cancer Research 60, 266-268.

Stuart, G.R., Oda, Y., de Boer, J.G. and Glickman, B.W. (2000) Mutation frequency and specificity with age in liver, bladder and brain of *lacI* transgenic mice. Genetics 154, 1291-1300.

Stuart, G.R., Oda, Y., de Boer, J.G. and Glickman, B.W. (2000) No change in spontaneous mutation frequency or specificity in dietary restricted mice. Carcinogenesis 21, 317-319.

Stuart, G.R. and Glickman, B.W. (2000) Through a glass, darkly: Reflections of mutation from *lacI* transgenic mice. Genetics 155, 1359-1367.

Stuart, G.R., Thorleifson, E., Okochi, E., de Boer, J.G., Ushijima, T., Nagao, M. and Glickman, B.W. (2000) Interpretation of mutational spectra from different genes: Analyses of PhIP-induced mutational specificity in the *lacI* and *cII* transgenes from colon of Big Blue® rats. Mutation Research 452, 101-121.

Stuart, G.R., Influences of Ageing and Diet on Mutational Frequency and Specificity in Big Blue® *lacI* Transgenic Rodents. Ph.D. Dissertation, University of Victoria, 1999.

Okonogi, H., **Stuart, G.R.**, Okochi, E., Ushijima, T., Sugimura, T., Glickman, B.W. and Nagao, M. (1997) Effects of gender and species on spectra of mutation induced by 2-amino-1-

methyl-6-phenylimidazo[4,5-*b*]pyridine in the *lacI* transgene. Mutation Research 395, 93-99.

Dycaico, M.J., **Stuart, G.R.**, Tobal, G.M., de Boer, J.G., Glickman, B.W. and Provost, G.S. (1996) Species-specific differences in hepatic mutant frequency and mutational spectrum among lambda/*lacI* transgenic rats and mice following exposure to aflatoxin B_1. Carcinogenesis 17, 2347-2356.

Stuart, G.R., Gorelick, N.J., Andrews, J.L., de Boer, J.G. and Glickman, B.W. (1996) The genetic analysis of *lacI* mutations in sectored plaques from Big Blue® transgenic mice. Environmental and Molecular Mutagenesis 28, 385-392.

Mazur-Melnyk, M., **Stuart, G.R.** and Glickman, B.W. (1996) Benzo[*a*]pyrene diol-epoxide induces loss of heterozygosity in a Chinese hamster ovary *aprt* heterozygote. Mutation Research 358, 89-96.

Stuart, G.R., Application of the single-cell gel electrophoresis ('Comet') assay to lymphocytes exposed in vitro to captan, a fungicide. M.Sc. Thesis, University of British Columbia, 1995.

Pohajdak, B., Dixon, B. and **Stuart, G.R.**, Immune System, In: Biochemistry and Molecular Biology of Fishes, Volume 2, Chapter 8. Hochachka, P.W., and Mommsen, T.P. (Eds), Elsevier Science Publishers B.V., Amsterdam, 1993. pp. 191-205.

Stuart, G.R., Dixon, B. and Pohajdak, B. (1992) Isolation of a putative retrovirus pol gene fragment from trout. Comparative Biochemistry and Physiology. B Comparative Biochemistry 102, 137-142.

Stuart, G.R. and Chambers, R.W. (1987) Synthesis and properties of oligodeoxynucleotides with an AP site at a preselected position. Nucleic Acids Research 15, 7451-7462.

REFERENCES

References are available upon request by e-mail to Victoria.A.Stuart@gmail.com