Dr. Victoria A. Stuart, Ph.D.

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PERSONAL STATEMENT

I envision innovative, impactful solutions to scientific and societal issues through the application of science and technology to the betterment of human health.

I accomplish this through

(i) the practical advancement of knowledge in functional genomics (the phenotypic and functional expression of the information contained within genomes), and

(ii) knowledge discovery, through natural language processing and machine learning approaches applied to the biomedical domain.

These efforts build on my thorough grounding in biochemistry (B.Sc.), environmental health (M.Sc.), molecular genetics (Ph.D), and post-doctoral experience in informatics and knowledge discovery.

I am especially motivated by information retrieval/extraction, the construction and leveraging of knowledge stores and graphical models, and the application of that knowledge to real-world problems including: molecular biology; cellular signalling; cancer genomics; personalized medicine; ...

The union of my core domains (genomics; programming; natural language processing; machine learning; bioinformatics) enables a better understanding of implicit and explicit relationships and interactions, facilitating translational knowledge discovery.

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

Scientific Consultant Jun 2009 - Present

I have been self-employed since June 2009 as a Scientific Consultant, providing scientific expertise in molecular genetics, genomics, molecular biology, life sciences, bioinformatics and scientific review. During this time 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.).

RECENT AFFILIATIONS

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

EXPERIENCE & SKILLS

With formal training and comprehensive 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/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

Supplementing this experience is my acquisition of more recent training/expertise in programming and bioinformatics. My more recent work (Jan 2014 - present) predominantly revolves around:

Machine Learning:
- computer vision (classification; captioning; ...)
- vector space models
- NLP

Information:
- retrieval
- extraction
- storage (RDB; ...)
- processing, relationships

Knowledge:
- knowledge stores
- graphical graphs (Neo4j)
- knowledge discovery (Cypher; ...)

Programmatic: command-line: bash scripts, ...; Python; R; ML (TensorFlow/Caffe/...)

Platforms: Apache Solr; PostgreSQL; Neo4J; various IDE; virtual environments

Operating Systems: Linux (super-user: compiling; debugging; ...)

Community: StackOverflow: https://stackoverflow.com/users/1904943/victoria-stuart
GitHub: https://github.com/victoriastuart
Gists: https://gist.github.com/victoriastuart

LEADERSHIP & SCIENTIFIC SERVICE

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

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

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: hundreds (>230) of 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.

TEACHING & MENTORSHIP

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

Supervision: undergraduate students and technical staff (various)

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

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