
Stephen A. Krawetz

Charlotte B. Failing Professor of Fetal Therapy and Diagnosis, Department of Obstetrics and Gynecology, Center for Molecular Medicine & Genetics, C.S. Mott Center for Human Growth and Development, Wayne State University School of Medicine

Education/Training

University of Toronto, Toronto, Ontario, Canada	06/1977	B.Sc.	Biochemistry
University of Toronto, Toronto, Ontario, Canada	03/1983	Ph.D.	Biochemistry
University of Calgary, Calgary, Alberta, Canada	10/1989	Postdoctoral (AHFMR)	Molecular Biology

Personal Statement

My entry into high-throughput systems-scale genomics began with the creation of the first computer-based video-acquisition sequencing system as I was completing my postdoctoral fellowship. To develop appropriate base calling data interpretation algorithms, I was the first to describe and characterize sequence error rates within genomic data available with GeneBank. As a faculty member, the mapping of DNase I-sensitive chromatin domains in human spermatozoa paralleled the in-depth analysis using humanized animal models, which showed that a nick by topoisomerase II is one of the first events that readies a chromatin domain for transcription. My laboratory was one of the first to adopt a genome-wide systems approach, directly addressing whether we had identified the exception or the rule. This included developing chromosome-specific aCGH and genome-wide 454 sequencing capabilities in collaboration with the Joint Genome Initiative as we transitioned to Illumina Sequencing. We have expanded our capabilities to determine the metamorphosis of the 3D genome of the male gamete. Data extraction and analysis required the creation of custom computer code that was not available when the projects were initiated. The goals of my program expanded to include understanding the contribution of paternal RNAs at fertilization to the development of a healthy child. Contrary to dogma, we showed that at the time of fertilization, the spermatozoon delivers a cadre of unique mRNAs along with small RNAs, including antisense and microRNAs to the oocyte (1), which has now been expanded to RNA elements and directly tested as components of early human development from type a dark spermatogonium to blastocyst (2). The unique attributes of this transcriptionally and translationally inactive system have pushed us to develop and translate a series of whole-genome analysis tools to objectively assess fertility status as a bellwether of disease (3). This has helped shape public policy regarding the environmental impact of fathers' contributions to their children (4).

1. Ostermeier, G.C., Miller, D., Huntriss, J.D., Diamond, M.P. and Krawetz, S.A. (2004) Delivering spermatozoan RNA to the oocyte. *Nature* 429:154. PMID: 15141202
2. Estill, M.S., Hauser, R. Krawetz, S.A. (2019) RNA element discovery from germ cell to blastocyst. *Nucleic Acids Research* 47:2263–2275. (**cover feature**) PMID: 30576549
3. Jodar, M., Sendler, E., Moskovtsev, S. Librach, C., Goodrich, R., Swanson, S., Hauser, R., Diamond, M. and Krawetz, S.A. (2015) Absence of sperm RNA elements correlates with idiopathic male infertility. *Science Translational Medicine*. 7(295):295re6. PMID: 26157032
4. National Academies of Sciences, Engineering and Medicine Gulf War and Health: Volume 11: Generational Health Effects of Serving in the Gulf War (2018) ISBN 978-0-309-47823-6 PMID: 30629394.

A. Positions, Scientific Appointments and Honors (Abridged)

Positions

11/22 -date	Charlotte B. Failing Professor (Tenure), Ob/Gyn & Mol. Medicine & Genetics, C.S. Mott Center for Human Growth & Development, Wayne State University School of Medicine
11/10 -11/22	Charlotte B. Failing Professor (Tenure), Ob/Gyn & Mol. Medicine & Genetics; Associate Director, C.S. Mott Center for Human Growth & Development, Wayne State University School of Medicine

09/04-08/07	Charlotte B. Failing Professor (Tenure), Ob/Gyn & Mol. Medicine & Genetics & Inst. for Sci. Comp.; Director, WSU Bioinformatics Node Michigan Life Sciences Corridor; Director, Center of Excellence: Paternal Impact of Toxicological Exposure, Wayne State University School of Medicine
06/01-09/04	Charlotte B. Failing Professor (Tenure), Ob/Gyn & Mol. Medicine & Genetics & Inst. for Sci. Comp., Wayne State University School of Medicine
08/00-06/01	Professor (Tenure), Ob/Gyn & Center for Mol. Medicine & Genetics & Inst. for Sci. Comp., Wayne State University School of Medicine
10/94-08/00	Associate Professor (Tenure), Ob/Gyn & Mol. Medicine & Genetics, Wayne State University School of Medicine
02/89-11/89	Assistant Professor (Research), Mol. Biol. & Genetics & Center for Mol. Biol., Wayne State University School of Medicine

Scientific Appointments

Editorial Board Memberships (Active)

2011-date	Frontiers in Epigenomics and Epigenetics
2008-date	Systems Biology in Reproductive Medicine, Founding Editor-in-Chief
2004-date	Cellular and Molecular Biology Letters

Advisory Boards and Committees

2019 – 2022	ReproUnion - Infertile cohort protocol (Denmark/Sweden)
2019 – date	Founding Member – CPTBR: A Collaborative Program Translating Basic Research to Clinical Trial in Idiopathic Infertility
2014–date	State of Michigan Infertility Advisory Committee
2012–date	External Advisory Board, Bioinformatics Core Kansas IDea Network for Biomedical Research Excellence, The University of Kansas
2010–date	Michigan Alliance for Reproductive Technologies and Science (MARTS) Executive Academic Committee

Honors (Selected from 29)

2024	Elected and inducted into the American Association for the Advancement of Science Fellow, Section on Biological Sciences
2022	Top 10 Downloaded Papers "Immune regulatory molecules as modifiers of semen and fertility" Molecular Reproduction and Development. 86 :1485-1504.
2019	BoR Top Review Article Award "A history of why father's RNA matters", Biology of Reproduction 99 :147-159,
2017	Albert Nelson Marquis Lifetime Achievement Award
2013-2014	Research Faculty Award
2010	Research Excellence Award, Wayne State University School of Medicine
2005	Wayne State University Board of Governors Faculty Recognition Award

C. Contribution to Science:

321 PUBLICATIONS h-index 72, i10-index 203 Google Scholar, Web of Science 55
(Papers, Reviews, Books & Chapters, Patents, Federal and State White Papers and Committee Reports, Editorials & Technical Comments)
Over 600 DATASETS, SERIES AND SEQUENCES DEPOSITED @ NCBI

My Bibliography @ <https://pubmed.ncbi.nlm.nih.gov/?term=krawetz%20s&sort=date&size=200>