

Statistics Seminar
Department of Mathematical Sciences

DATE:	Thursday, October 19, 2017
TIME:	1:15pm - 2:15pm
LOCATION:	WH G02 (note special location)
SPEAKER:	James O. Ramsay, McGill University
TITLE:	From Brain to Hand to Statistics with Dynamic Smoothing

This talk is part of the Dean's Speaker Series in Statistics and Data Science.

Abstract

Systems of differential equations are often used to model buffering processes that modulate a non-smooth high-energy input so as to produce an output that is smooth and that distributes the energy load over time and space. Handwriting is buffered in this way. We show that the smooth complex script that spells "statistics" in Chinese can be represented as buffered version of a series of 46 equal-interval step inputs.

The buffer consists of three undamped oscillating springs, one for each orthogonal coordinate. The periods of oscillation vary slightly over the three coordinate in a way that reflects the masses that are moved by muscle activations. Our analyses of data on juggling three balls and on lip motion during speech confirm that this model works for a wide variety of human motions.

We use the term "dynamic smoothing" for the estimation of a structured functional object that is input to a buffer.

About the speaker: James O. Ramsay is a retired Emeritus Professor in the Psychology Department at McGill University, and a retired Associate Member of Department of Mathematics and Statistics with adjunct appointments in the Department of Chemical Engineering, Queen's University and the Department of Mathematics and Statistics, University of Ottawa. Jim has had a long and distinguished career as a researcher. He is internationally acclaimed as the founder of Functional Data Analysis. He has contributed widely to the development of the field and to its dissemination through numerous publications and software libraries in Matlab and R. Jim has also made highly influential contributions to multidimensional scaling and nonparametric statistics, in addition to solving a range of problems in psychometrics and much more. In recognition of his work, Jim was awarded the 1998 Gold Medal of the SSC. He was also the recipient of The Canadian Journal of Statistics Best Paper Award in 2000. Jim was President of the SSC (2002-2003). A fellow of the Canadian Psychological Association, Jim also served as President of the Psychometric Society (1981-1982) and as Chair of his department (1986-1989), among others.

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