

Tondeur Lectures in Mathematics

April 25-27, 2017

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presents

Topological Quantum Field Theories in Homotopy Theory

Lecture I. Cobordisms: old and new
4 pm, Tuesday, April 25, 314 Altgeld Hall

Cobordisms have played an important part in the classification of manifolds since their invention in the 1950s. In a different way, they are fundamental to the axiomatic approach to Topological Quantum Field Theory. In this colloquium style talk I will explain how recent results have shed new light on both of them.

Please join us at a reception in 239 Altgeld Hall from 5:00-6:00 pm immediately following this lecture.

Lecture 2. Classifying spaces of bordism categories and a filtration of Thom's theory
4 pm, Wednesday, April 26, 245 Altgeld Hall

We describe a refinement of a theorem with Galatius, Madsen and Weiss which describes the classifying space of bordism categories. In particular this can be interpreted to give evidence for the cobordism hypothesis for invertible TQFTs.

Lecture 3. Operads from TQFTs
4 pm, Thursday, April 27, 245 Altgeld Hall

Manifolds give rise to interesting operads, and in particular TQFTs define algebras over these operads. In the case of Atiyah's 1+1 dimensional theories these algebras are well-known to correspond to certain algebras. Surprisingly, independent of the dimension of the underlying manifolds, in the topologically enriched setting the manifold operads detect infinite loop spaces. We will report on joint work with Basterra, Bobkova, Ponto, Yeakel.

The bi-annual Tondeur Lectures in Mathematics are named in honor of Professor Emeritus Philippe Tondeur who joined the department in 1968 and served as its chair from 1996-1999. He was Director of the Division of Mathematical Sciences at the National Science Foundation (NSF) from 1999-2002. He has published over 100 papers and monographs mainly on his research in differential geometry and topology, in particular the geometry of foliations and geometric applications of partial differential equations. Tondeur is the recipient of numerous awards and honors in recognition of his research, teaching, and service to the profession. In 2009 he was selected in the first class of Fellows of SIAM, in 2010 he was selected a Fellow of AAAS, and in 2012 he was elected in the first class of Fellows of the AMS.



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