

RESEARCH INTERESTS OF FRANK DEN HOLLANDER
(update: 23 May 2018)

Research interests – areas:

- Probability Theory
- Statistical Physics
- Ergodic Theory
- Population Genetics
- Complex Networks

Research interests – topics:

large deviation theory
complex networks
random graphs: static and dynamic
random polymers
metastability of interacting particle systems
transitions between Gibbs and non-Gibbs under stochastic dynamics
breaking of ensemble equivalence
random walks in static and dynamic random environments
parabolic Anderson model: intermittency in catalytic random media
branching processes in random environments
heat conduction and spectra in random domains
Wiener sausage
critical percolation and invasion percolation
interacting diffusions, measure-valued diffusions and Cannings processes
renormalisation
variational principles for capacity
ergodic classification of random sequences
population genetics
immunology
synchronisation
fluorescence in photosynthesis

A common theme in my research has been the application of large deviation theory and potential theory to interacting particle systems, multi-type genetic populations and complex networks. My focus has been on the description of critical behaviour and phase transitions with the help of variational techniques.

Research monographs:

- F. den Hollander, *Large Deviations*, Fields Institute Monographs, Volume 14, American Mathematical Society, Providence RI, 2000, x + 143 pp., ISBN 0-8218-1989-5. (Second print in 2008.)
- F. den Hollander, *Random Polymers*, Lecture Notes in Mathematics, Volume 1974, Springer, Berlin, 2009, xiii + 258 pp., ISBN 978-3-642-00332-5.
- A. Bovier and F. den Hollander, *Metastability – A Potential-Theoretic Approach*, Grundlehren der mathematischen Wissenschaften 351, Springer, Berlin, 2015, xxi + 581 pp., ISBN 978-3-319-24775-5.