

Alexei Tsygvintsev

Maître de conférences Hors Classe · UMPA, École Normale Supérieure de Lyon
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Mathematician (Ph.D. 2001, HDR 2006) with over twenty years of experience in dynamical systems and mathematical biology at École Normale Supérieure de Lyon. Core expertise in mathematical modelling of tumour-immune dynamics, cancer immunotherapy and antiviral immune response, developed through a six-year Indo-French collaborative research programme (IFCAM-CNRS) and joint work with D. Kirschner (University of Michigan) on tumour immunotherapy dynamics. Also active in machine learning for biological sequence data and in AI policy, having coordinated a CNRS national programme on artificial intelligence and contributed to the French government's 2018 national strategy report on AI (Mission Villani). Since 2024, AMIES correspondent for UMPA — the French national agency for mathematics-industry interaction. Available for independent expert consultations, model review and short advisory engagements, alongside academic duties.

TUMOUR-IMMUNE DYNAMICS & IMMUNOTHERAPY MODELLING

Coordinator, “Mathematical Modelling in Cancer Immunotherapy”

Indo-French Centre for Applied Mathematics (IFCAM-CNRS), with S. Banerjee · 2012–2016

On the global dynamics of a model for tumor immunotherapy

with D. Kirschner · Mathematical Biosciences and Engineering, 6(3), 573–583, 2009

Bounded immune response in immunotherapy described by a deterministic delay Kirschner-Panetta model

with S. Banerjee · Applied Mathematics Letters, 35, 90–94, 2014

Stability and bifurcations of equilibria in a delayed Kirschner-Panetta model

with S. Banerjee · Applied Mathematics Letters, 40, 65–71, 2015

A mathematical model of gene therapy for the treatment of cancer

with D. Kirschner and S. Marino · in Mathematical Models and Methods in Biomedicine, Springer, 2012

On the global attractors in one mathematical model of antiviral immunity

Comptes Rendus. Mathématique, 358, 1199–1205, 2020

MACHINE LEARNING & ARTIFICIAL INTELLIGENCE

Coordinator, SIGMAPAD (CNRS PEPS “Intelligence Artificielle et Apprentissage Automatique”)

INSMI & INS2I, CNRS, with AMIES · 2018–2020

Contributor heard for the national AI strategy report (Mission Villani)

French government · 2018

Scientific curator, “Intelligence Artificielle” exhibition

Maison des Mathématiques et de l’Informatique de Lyon · 2019–2021

On the overfly algorithm in deep learning of neural networks

Applied Mathematics and Computation, 349, 348–358, 2019

Natural vs. random protein sequences — a neural network approach based on time series analysis

Journal of Proteins and Proteomics, 11, 11–16, 2020

OTHER EXPERTISE

- AMIES correspondent for UMPA (Agence pour les Mathématiques en Interaction avec l'Entreprise et la Société), since 2024; steering committee member, “Soirées Mathématiques de Lyon”, since 2024.
- Scientific supervisor of a postdoctoral researcher (G. Gutierrez), UMPA, since 2025; ongoing work on syzygies in the three-body problem (2021–present).
- Dynamical systems, celestial mechanics and the three-body problem — 15 papers on integrability, non-integrability and syzygies, incl. Nonlinearity, Crelle's Journal, C.R. Acad. Sci. Paris.
- Analytic theory of continued fractions and renormalization theory (Feigenbaum–Cvitanović equation).
- Referee for Nonlinearity, Journal of Mathematical Physics, Inverse Problems, Annales Scientifiques de l'ENS; reviewer for Mathematical Reviews and Zentralblatt MATH.
- Evaluator for the French National Research Agency (ANR), 2015–2016.
- Software: Mathematica, Maple, MATLAB, Scilab, Python, Java.

EDUCATION

Habilitation à Diriger des Recherches (HDR)

École Normale Supérieure de Lyon · 2006 · “Intégrabilité, renormalisation et fractions continues”

Ph.D. in Mathematics (cotutelle)

University of Moscow (Lomonosov), advisor V. Kozlov, & Université Paul Sabatier, Toulouse, advisor L. Gavrilov · 2001 · “La non-intégrabilité méromorphe du problème plan des trois corps”

Diploma in Mathematical Physics

Udmurt State University, Izhevsk, Russia · 1997

CAREER

Maître de conférences Hors Classe, UMPA, École Normale Supérieure de Lyon

2003–present · promoted to Hors Classe, 2020 · on CNRS research delegation, 2019–2020

Invited speaker, 8th Workshop on Hamiltonian Systems, Kyoto

2023

Invited speaker, colloquium on celestial and Newtonian mechanics, Avignon

2023

Leverhulme Trust Research Fellow, University of Exeter, UK

2002–2003

Postdoctoral researcher, University of Loughborough, UK

2001–2002

Teaching assistant, University of Geneva, Switzerland

2000–2001

LANGUAGES & AVAILABILITY

Russian (native), French (fluent), English (professional working proficiency). Available for expert consultations, model review and short advisory engagements outside academic duties, by arrangement.