LEPOUTRE Thomas

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Born on 1984/02/02, French citizen
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Education and positions

Since October 2010	**INRIA Junior researcher (CR2 then CR1) in project team DRACULA** *Inria Rône Alpes and Institut Camille Jordan (Lyon 1)*
2017	**Habilitation à diriger des recherches** Contributions en dynamique de populations *Université Claude Bernard Lyon 1 (France)* defended on April 24. 2017 reviewers A. Benabdallah (Univ. Aix Marseille) A. Jungel (TU Wien) and H. Zaag (U. Paris 13), examiners: M. Adimy (Inria, Lyon), F. Lagoutière (Univ. Claude Bernard Lyon1) and B. Perthame (UPMC) Manuscript: https://hal.inria.fr/tel-01524261
2007-2009	**PHD in applied mathematics: Analysis and modelling of growth and motion phenomenon from biology** *Université Pierre et Marie Curie Paris (France)* *supervisors: J. Clairambault, S. Gaubert and B. Perthame*
2006-2007	**Master 2 (Applied mathematics in life sciences)** *Université Pierre et Marie Curie Paris (France)*
2006	**Agrégation de mathématiques (Degree for teaching)**
2005	**Second semester (Master 1) at Imperial College London (UK)**
2003-2008	**Student in mathematics at École Normale Supérieure de Lyon (France)**

PhD students

since 2022	**Maxime Estavoyer** Modelling for bird feathers formation
since 2021	**Baptiste Maucourt** (co-supervision with L. Girardin and B. Boussau) Spatial models for pest resistance in agro-ecology
2019-2022	**Elias Ventre** (co-supervision with T. Espinasse and O. Gandrillon) Models for gene network inference from single cell data (`https://tel.archives-ouvertes.fr/tel-03848137`)
2018-2022	**Kyriaki Dariva** Contributions to the study of stability in cell population models (Manuscript `https://hal.inria.fr/tel-03956608v1`)
2014-2017	**Alvaro Matteos Gonzales** (co-directed with H. Berry and V. Calvez) Study of an age-structured renewal equation with space jumps in the framework of intracellular subdiffusion (Manuscript) `https://tel.archives-ouvertes.fr/tel-01701022`
2014-2017	**Apollos Besse** , (co-direction with S. Bernard) Mathematical modeling of chronic myeloid leukemia and its treatments. (Manuscript `https://tel.archives-ouvertes.fr/tel-01561249`)

Interns

2022	Marion Dufeu (4A Insa$\sim$ M1) Inference for relaxation models of gene expression (with O. Gandrillon)
2021	Théo Kaprelian (M2) Turing instabilities and sequentiality
2020	Maxime Estavoyer and Benoit Nieto (M1 TER) study of articles on Turing instabilities for hydra.
2019	Tasnim Fareh (L3 medicine-research with H. Berry neuroscience models)
2019	Celestin Bigarre (M1 with O. Gandrillon) modeling for gene expression relaxation
2019	Emile Deleage (L3 ENS Lyon G. Laibbe and L. Tine)
2018	Kiryaki Dariva (M2) lag modeling for leukemia
2018	Marion Morize (L3 medicine-research) treatment for leukemia
2017	Baptiste Cercle (L3 ENS Lyon) internship on relaxed control, application to leukemia models.
2016	Emma Leschiera (L2) TIPE on ODEs in neurosciences
2014	Alvaro Matteos Gonzales (M2) co-supervised with Berry and V. Calvez, internship leading to a PhD
2014	Apollos Besse (M2), co-supervised with S. Bernard, internship leading to a PhD
2013	Cigdem Ak (M2), co-supervised with F. Crauste on the modeling of erythropoiesis (red blood cell formation)
2013	Martin Legras (L3) on multi-scale toy models,
2011	Claire Elias (M1 TER) co-supervised with S. Bernard, on the application of the Floquet exponent study to cancer chronotherapy.

Participations to resarch projects

	As Investigator
Since 2022	Partner for ANR Grant (PI Marie Manceau Collège de France) PLUME on modelling feather formation
2021-2023	IXXI project on gene expression relaxation experiments (avec O. Gandrillon, funding an intern).
2017-2021	(with V. Bansaye, CMPA Ecole Polytechnique) GDR MaMoVi. French research networks on mathematical modelling in life sciences.
Since 2012	Inria Partnerships programm Modelling Leukemia `http://dracula.univ-lyon1.fr/modelling_leukemia.php`. This programm funds exchange between our team and the group of Doron Levy (CSCAMM, University of Maryland, USA) on the mathematical modelling of leukemia.
2011	Inria Programme Explorateur : funding for a 5 weeks stay at CSCAMM (led to the Inria Patrnerships afterwards).
	Member
Since 2014	ERC MESOPROBIO (PI: V. Calvez, ENS Lyon, France)
Since 2013	member of ANR Grant KIBORD (PI: Laurent Desvillettes,CMLA ENS CACHAN, France) `https://www.ljll.math.upmc.fr/kibord/`. This programm is dedicated to the development of PDEs methods for issues coming out of biology and connected subjects (chemistry, medical sciences).
before	member of the young resarcher ANR Grant MODPOL (PI: Vincent Calvez, ENS LYON, France), ANR Procell (PI: Fabien Crauste, UCBL Lyon 1, France), ANR Toppaz (PI: Marie Doumic Inria Paris, France)

Collaborations

Oct. 2016	**short visit to Doron Levy** *College Park (USA)* .
Nov. 2015	**short visit to Doron Levy** *College Park (USA)* .
May 2015	**short visit to Doron Levy** *College Park (USA)* .
Nov. 2014	**short visit to Doron Levy** *College Park (USA)* .
Aug 2013	**2 weeks visit to Peter Kim** *University of Sydney (Australia)* .
Dec 2012	**2 weeks visit to Doron Levy** *College Park (USA)* .
May-Jun. 2012	**2 months visit to Nicolas Meunier** *Université Paris Descartes* .
Oct.-Nov. 2011	**5 weeks visit to Doron Levy** *College Park (USA)* .
Mar. 2011	**2 weeks visit to Salome Martinez** *CMM Santiago (Chile)* .
Jan. 2010	**2 weeks visit to Salome Martinez** *CMM Santiago (Chile)* .
Jun. 2008	**2 weeks visit to Mostafa Bendahmane** *Universidad de Concepcion (Chile)* .

Organization of conference

Jan. 2022	Organizing comittee IHP Tissue growth and movement `https://indico.math.cnrs.fr/event/6529/`
Sept. 2017	GDR MAMOVI kick-off session (Lyon)
july 2016	co-organizer of school "EDP et Probabilités pour les sciences du vivant" (`http://programme-scientifique.weebly.com/1426.html`) .
July 2015	member of the organizig comittee of EQUADIFF 2015 `https://equadiff2015.sciencesconf.org/` (Lyon) .
October 2013	co-organizer of GDR METICE days (Lyon) .
may 2013	co-organizer of EMS-ESMTB school "Multiscale modeling in the life sciences" (`http://mathbio2013.sciencesconf.org/resource/page/id/5`) .
Sept. 2012	co-organizer of school "Modélisation en dynamique de populations et évolution" (`http://www.cmap.polytechnique.fr/\~ecolemathbio2012/index.php`) .
Nov. 2011	minisymposium at SIAM Conference on Analysis of Partial Differential equations (San Diego, USA).

Jurys and comittees

2023	PhD jury, 2023 Delphine Bretonniere (Centre de Biologie Intégrative, Toulouse, reviewer)
2023	PhD jury, Elisabetta Brochierri (Univ. Evry, reviewer)
2022	PhD jury, Emma Leschiera (Sorbonne Univ., examiner)
2022	PhD jury, Bachar Tarraf (Univ. Bordeaux, reviewer)
2019	Hiring comittee MCF Rennes 1 (IGDR)
2017	PhD jury, Athmane Bakhta (CERMICS, reviewer)
2016	PhD jury, Bastien Polizzi (Nice, examiner)
2014	Hiring comittee MCF Lyon 1
2013	Hiring comittee MCF Paris Sud

Collective responsibilities

ongoing	application of the new Inria project team for which I would be **team leader** following DRACULA team.
since 2022	Scientific board of GDR MathSaV (PI F. Crauste)
since 2020	Elected member of laboratory council
since 2020	Elected member of AGOS comittee (social action, Inria)
2014-2019	Co-organisaer of Mathalyon (mathematics exhibition in highschools of Lyon area for initiation to research) `http://math.univ-lyon1.fr/spip.php?article83`
2014-2019	Comission Cordi-S Inria Rhône-Alpes (selection comittee for PhD grants)
2013-2015	Organizer of biomaths seminar
2010-2015	member of Opérations Postes (website clarifying recruitment process for Ph. D. candidates) .
2011-2014	member of the press team for images des Mathématiques (we collect articles mentionning mathematics in press and summarize them every month).
Since 2010	yearly interventions in high schools for the mathematics exhibition **Mathalyon**

Communications

Dec. 2023	PDE Seminar *Univ. Tours*
March. 2023	Cross-diffusion models *Konstanz*
Sep.-22	BioSyL day *Lyon*
Oct.-21	Non-Local Models Arising from Biology *CIRM Marseille*
July-19	ICIAM : MS on cross diffusion *Valencia, Spain*
Apr.-19	Tumors and Immune Systems: From Theory to Therapy *Cargese, France*
Nov.-18	Mathematical Challenges in the Analysis of Continuum Models for Cancer Growth, Evolution and Therapy *CMO, Oaxaca, Mexico*
July-18	Asymptotic approach to spatial and dynamical organizations *LJLL, Paris*
July-18	Mathematical Perspectives in Cancer Biology and Therapeutics *CIRM, Marseille*
June-18	*CANUM (MS talk) Agde*
mai-18	Seminar *Montpellier*
March-18	Seminar *Université Paul Sabatier, Toulouse*
Feb.-18	*Inria-Fields meeting, Toronto, Canada*
June-17	Conférence "PDMPs, Theory and applications" Seillac
mai-17	Workshop Cross diffusion and kinetic equations for biology Vienne
mai-17	Seminar, Caen
Dec.-16	CIMPA School, Ile Maurice
Oct.-16	Seminar, CERMICS
Dec.-15	CSCAMM Seminar, Univ. Maryland (College Park, USA)
Feb.-15	Seminar,, Paris 13
Dec.-14	Journées MMCS, Lyon
Oct.-14	Workshop ANR Stab, Univ. Lyon 1
July-14	Special session AIMS conference, Madrid, Espagne
July-14	Session GDR Metice, Univ. Paul Sabatier, Toulouse
Aug.-13	PDE seminar, Univ. Sydney, Australie
June-13	CIMPA Research School 'PDE Methods in Biology and Medicine', La Habana, Cuba
Apr.-13	Seminar, Institut Elie Cartan, Nancy
Dec.-12	Cancer RIT Seminar, Univ. Maryland (College Park, USA)
Nov.-11	Minisymposium on age structured models, SIAM conference on PDE (San Diego)
Nov.-11	CSCAMM Seminar, Univ. Maryland (College Park, USA)
mai-11	SMAI conference, Guidel
Dec.-10	Seminar, LMPT, Tours
Feb.-10	Seminar, LATP, Marseille
Feb.-10	Seminar, Univ. d'Evry-Val de Marne
Feb.-10	Seminar, Univ. Lyon 1
Feb.-10	Seminar, Univ. Heidelberg (Allemagne)
Jan.-10	Conférence WONAPDE, Concepcion, Chili
Nov.-09	Applied and Computational Analysis Graduate Seminar, Univ. Cambridge (UK)
July-09	Seminar,Laboratoire Jacques Louis Lions, Univ. Pierre et Marie Curie
June-09	PDE-probability graduate days, Univ. Pierre et Marie Curie
March-09	Mathematical model for cell division, Institut Henri Poincaré
Feb.-09	Advanced Course on Mathematical Biology, CRM (Barcelona)
June-08	Seminar, Concepcion, Chile
Feb.-08	Seminar of Inria ANUBIS team, Univ. Bordeaux-Talence
Aug.-07	Summer school, Univ. Dundee Ecosse

Divers

Reviewer for Applicable Analysis, Applied Mathematical Letters, Bulletin of Mathematical Biology, Communication in Mathematical Sciences, Computational and Applied Mathematics, Discrete and Continuous Dynamical Systems B, ESAIM: Mathematical Modelling and Numerical Analysis, ESAIM: proceedings and surveys, Journal of Biological Dynamics, Journal of Differential Equations, Journal of evolution equations , Journal of Mathematical Biology, Journal of Royal Society Interfaces, Kinetic and Related Models, Mathematical Control and Related Fields, Mathematical Modelling of Natural Phenomenon, Methods and Applications of Analysis, Networks and Heterogeneous Media, Nonlinear Analysis, Numerical Methods for Partial Differential equations , Physica D, Siam Journal of Mathematical Analysis, Zeitschrift fur Angewandte Mathematik und Physik

Teaching

2023	Mathematics for medicine students (cursus Health and Sciences for 20 students)
2016-2022	Agrégation (Option B: Scientific Computing and Modelling), UCBL (Lyon 1).
Jan.- June 2016	Agrégation (Option B: Scientific Computing and Modelling), UCBL (Lyon 1).
Sept.-dec 2015	Master 2 lectures on integro-differential equations (shared with L. Tine)
Sept.-dec 2014	Master 2 lectures on integro-differential equations (shared with L. Tine)
Sept.-dec 2013	Master 2 lectures on integro-differential equations (shared with V. Calvez)
Sept.-dec 2013	Exercises class of Master 2 lectures on Hamilton Jacobi equations (lecturer V. Calvez)
Jan.-June 2013	Agrégation (Option B: Scientific Computing and Modelling), UCBL (Lyon 1).
Sept.-dec 2012	Exercises class of Master 2 lectures on Hamilton Jacobi equations (lecturer V. Calvez)
Jan.-June 2012	Agrégation (Option B: Scientific Computing and Modelling), UCBL (Lyon 1).
Jan.-June 2012	Student seminar on Perron Frobenius theory and population dynamics, ENS LYON (with V. Calvez)
Dec. 2011	Short introduction to population dynamics, ENS CACHAN
2007-2010	Exercises class, Université Pierre et Marie Curie (L1-L2)

Miscelleanous

2010-2015	member of Opérations Postes (website clarifying recruitment process for Ph. D. candidates) .
2011-2014	member of the press team for images des Mathématiques (we collect articles mentionning mathematics in press and summarize them every month).
Since 2010	yearly interventions in high schools for the mathematics exhibition **Mathalyon**

Skills

Languages	English (fluent), French (native) and German (basics) .
Softwares	Scilab, Matlab, LaTeX.

Publications

[1] Dariva, Kyriaki and Lepoutre, Thomas. "Influence of the age structure on the stability in a tumor-immune model for chronic myeloid leukemia". In: *Math. Model. Nat. Phenom.* 19 (2024), p. 1.

[2] J. Garnier, O. Cotto, E. Bouin, T. Bourgeron, T. Lepoutre, O. Ronce, and V. Calvez. "Adaptation of a quantitative trait to a changing environment: New analytical insights on the asexual and infinitesimal sexual models". In: *Theoretical Population Biology* 152 (2023), pp. 1–22.

[3] T. Lepoutre and N. Meunier. "Analysis of a model of cell crawling migration". In: *Communications in Mathematical sciences* 20.6 (2022), pp. 1589–1611.

[4] V. Calvez, T. Lepoutre, and D. Poyato. "Ergodicity of the Fisher infinitesimal model with quadratic selection". In: *arXiv preprint arXiv:2107.00383* (2021). (accepted in Nonlinear Analysis).

[5] E. Ventre, T. Espinasse, C.-E. Brehier, V. Calvez, T. Lepoutre, and O. Gandrillon. "Reduction of a stochastic model of gene expression: Lagrangian dynamics gives access to basins of attraction as cell types and metastabilty". In: *J. Math. Biol.* 83.5 (Nov. 2021), p. 59.

[6] V. Calvez, T. Lepoutre, N. Meunier, and N. Muller. "Non-linear analysis of a model for yeast cell communication". In: *ESAIM: Mathematical Modelling and Numerical Analysis* (Sept. 2019).

[7] T. Lepoutre. "Improved duality estimates: time discrete case and applications to a class of cross-diffusion systems". In: *Communications in Mathematical sciences* 17.2 (Sept. 2019), pp. 339–351.

[8] A. Besse, G. D. Clapp, S. Bernard, F. E. Nicolini, D. Levy, and T. Lepoutre. "Stability analysis of a model of interaction between the immune system and cancer cells in chronic myelogenous leukemia". In: *Bull. Math. Biol.* 80.5 (2018), pp. 1084–1110.

[9] A. Besse, T. Lepoutre, and S. Bernard. "Long-term treatment effects in chronic myeloid leukemia". In: *J. Math. Biol.* 75.3 (Sept. 2017), pp. 733–758.

[10] T. Lepoutre and A. Moussa. "Entropic structure and duality for multiple species cross-diffusion systems". In: *Nonlinear Analysis* (Sept. 2017).

[11] H. Berry, T. Lepoutre, and Á. M. González. "Quantitative Convergence Towards a Self-Similar Profile in an Age-Structured Renewal Equation for Subdiffusion". In: *Acta Applicandae Mathematicae* 145.1 (2016), pp. 15–45.

[12] G. D. Clapp, T. Lepoutre, F. E. Nicolini, and D. Levy. "BCR-ABL transcript variations in chronic phase chronic myelogenous leukemia patients on imatinib first-line: Possible role of the autologous immune system". In: *OncoImmunology* 5.5 (Jan. 2016), e1122159.

[13] G. D. Clapp, T. Lepoutre, R. El Cheikh, S. Bernard, J. Ruby, H. Labussière-Wallet, F. E. Nicolini, and D. Levy. "Implication of the Autologous Immune System in BCR-ABL Transcript Variations in Chronic Myelogenous Leukemia Patients Treated with Imatinib." eng. In: *Cancer Res.* 75.19 (Oct. 2015), pp. 4053–4062.

[14] L. Desvillettes, T. Lepoutre, A. Moussa, and A. Trescases. "On the Entropic Structure of Reaction-Cross Diffusion Systems". In: *Communications in Partial Differential Equations* 40.9 (2015), pp. 1705–1747.

[15] S. Gaubert and T. Lepoutre. "Discrete limit and monotonicity properties of the Floquet eigenvalue in an age structured cell division cycle model". English. In: *J. Math. Biol.* (2015), pp. 1–41.

[16] F. Billy, J. Clairambault, O. Fercoq, S. Gaubert, T. Lepoutre, T. Ouillon, and S. Saito. "Synchronisation and control of proliferation in cycling cell population models with age structure". In: *Math. Comput. Simul* 96.0 (2014), pp. 66–94.

[17] L. Desvillettes, T. Lepoutre, and A. Moussa. "Entropy, Duality, and Cross Diffusion". In: *SIAM J. Math. Anal.* 46.1 (2014), pp. 820–853.

[18] T. Lepoutre and S. Martinez. "Steady state analysis for a relaxed cross diffusion model". Anglais. In: *Discrete and Continuous Dynamical Systems - Series A* 2 (2014), pp. 613–633.

[19] T. Lepoutre, N. Meunier, and N. Muller. "Cell polarisation model: The 1D case". In: *Journal de Mathématiques Pures et Appliquées* 101.2 (Feb. 2014), pp. 152–171.

[20] F. Thomas, D. Fisher, P. Fort, J.-P. Marie, S. Daoust, B. Roche, C. Grunau, C. Cosseau, G. Mitta, S. Baghdiguian, et al. "Applying ecological and evolutionary theory to cancer: a long and winding road". In: *Evol. Appl.* 6.1 (2013), pp. 1–10.

[21] R. El Cheikh, T. Lepoutre, and S. Bernard. "Modeling Biological Rhythms in Cell Populations". In: *Math. Model. Nat. Phenom.* 7 (06 2012), pp. 107–125.

[22] T. Lepoutre, M. Pierre, and G. Rolland. “Global Well-Posedness of a Conservative Relaxed Cross Diffusion System”. In: *SIAM Journal of Mathematical Analysis* 44.3 (2012), pp. 1674–1693.

[23] J. Clairambault, S. Gaubert, and T. Lepoutre. “Circadian rhythm and cell population growth”. In: *Math. Comput. Modelling* 53 (2011), pp. 1558–1567.

[24] M. Bendahmane, T. Lepoutre, A. Marrocco, and B. Perthame. “Conservative cross diffusions and pattern formation through relaxation”. In: *Journal de Mathématiques Pures et Appliqués* 92.6 (May 2009), pp. 651–667.

[25] J. Clairambault, S. Gaubert, and T. Lepoutre. “Comparison of Perron and Floquet Eigenvalues in Age Structured Cell Division Cycle Models”. In: *Math. Model. Nat. Phenom.* 4.3 (2009), pp. 183–209.

[26] M. Doumic, T. Goudon, and T. Lepoutre. “Scaling limit of a discrete prion dynamics model”. In: *Commun. Math. Sci.* Volume 7, Issue 4 (2009), pp. 839–865.