

# Claude Loverdo

claude dot loverdo at upmc dot fr  
http://www.normalesup.org/~loverdo/

Trained as a physicist, I develop models at the interface with biology, in collaboration with experimentalists.

## RESEARCH EXPERIENCE AND EDUCATION

---

01/2014 – ...	<b>Tenured CNRS researcher</b> Laboratoire Jean Perrin, Sorbonne Université, Paris, France
08 – 12/2013	<b>Post-doctoral research</b> <i>Within host dynamics of a pathogen</i> Roland Regoes, Sebastian Bonhoeffer, ETH, Zurich, Switzerland
09/2010 – 08/2013	<b>Post-doctoral research</b> <i>Cross-scale modeling of virus emerging in a new host</i> Jamie Lloyd-Smith Lab, UCLA, California, USA.
01 – 08/2010	<b>Post-doctoral research</b> <i>Modeling of transport within cell nucleus</i> Maxime Dahan and Pierre Desbiolles, Team Optics and Biology, LKB, École Normale supérieure, Paris, France
2006 – 2009	<b>PhD in physics</b> <i>Optimal search strategies and intermittent random walk : from restriction enzymes to the albatross flight</i> Olivier Bénichou, LPTMC, Université Pierre et Marie Curie, Paris, France
03 – 08/2005	<b>Internship</b> <i>Thermotaxis in E.Coli</i> Hanna Salman, Libchaber Lab, Rockefeller University, New-York, USA
06 – 07/2004	<b>Internship</b> <i>Study of special features of mesoscopic phase confined into 1d channels of nanometer size</i> Denis Morineau, Groupe de la matière condensée et des matériaux, Université de Rennes 1, France
2003	<b>Admittance to the École Normale Supérieure</b> Paris, France

## PUBLICATIONS

---

>30 publications, H-index 17 (Web of Science). Below, a selection of 11 publications.

F.Bansept, K.Moor-Schumann, M.Diard, W-D.Hardt, E.Slack, C.Loverdo *Enchained growth and cluster dislocation : a possible mechanism for microbiota homeostasis* Plos Computational Biology **15** e1006986 (2019)

F.Bansept, L.Marrec, A-F Bitbol, C.Loverdo *Antibody-mediated cross-linking of gut bacteria hinders the spread of antibiotic resistance* Evolution **73** 1077–1088 (2019)

M.Diard, E.Bakkeren, J.K.Cornuault, K.Moor, A.Hausmann, M.Sellin, C.Loverdo, A.Aertsen, M.Ackermann, M.De Paepe, E.Slack, W-D.Hardt, *Inflammation boosts bacteriophage transfer between Salmonella spp.* Science **355** 1211–1215 (2017)

K.Moor, M.Diard, M.E.Sellin, B.Felmy, S.Y.Wotzka, A.Toska, E.Bakkeren, M.Arnoldini, F.Bansept, A.D.Co, T.Völler, A.Minola, B.Fernandez-Rodriguez, G.Agatic, S.Barbieri, L.Piccoli, C.Casiraghi,

D.Corti, A.Lanzavecchia, R.R.Regoes, C.Loverdo, R.Stocker, D.R.Brumley, W.-D.Hardt, E.Slack *High-avidity IgA protects the intestine by enchainning growing bacteria* Nature **544** 498–502 (2017)

H.Qi, C.Anders Olson, N.Wu, R.Ke, C.Loverdo, R.Remenyi, V.Chu, S.Truong, Z.Chen, Y.Du, S-Y.Su, L.Q.Al-Mawsawi, T-T.Wu, S-H.Chen, C-H.Lin, W.Zhong, J.O.Lloyd-Smith, R. Sun, *A quantitative high-resolution genetic profile rapidly identifies sequence determinants of viral fitness and drug sensitivity*, Plos Pathogens **10** e1004064 (2014)

C.Loverdo and J.O.Lloyd-Smith *Evolutionary invasion and escape in the presence of deleterious mutations* Plos One, **8** e68179 (2013)

C.Loverdo and J.O.Lloyd-Smith *Inter-generational phenotypic mixing in viral evolution* Evolution, **67** 1815-1822 (2013)

C.Loverdo, M.Park, S.J.Schreiber and J.O.Lloyd-Smith *Influence of viral replication mechanisms on within-host evolutionary dynamics* Evolution, **66** 3462-3471 (2012)

O.Bénichou, C.Loverdo, M.Moreau and R.Voituriez *Intermittent search strategies* Review of Modern Physics, **83** 81-129 (2011)

C.Loverdo, O.Bénichou, R.Voituriez, A.Biebricher, I.Bonnet and P.Desbiolles *Quantifying hopping and jumping in facilitated diffusion of DNA-binding proteins* Physical review letters, **102** 188101 (2009)

C.Loverdo, O.Bénichou, M.Moreau and R.Voituriez *Enhanced reaction kinetics in biological cells* Nature physics **4** 134-137 (2008)

## MENTORING

<b>Post-doc</b>	Aurore Woller	2018–...	Sorbonne Université, Paris, France
<b>PhD student</b>	Florence Bansept	2015–2018	Sorbonne Université, Paris, France co-advised with Raphaël Voituriez
<b>Master's students</b>	Christian Vanhille	2019	Sorbonne Université, Paris, France
	Marina Torres-Lazaro	2018	Sorbonne Université, Paris, France
	Florence Bansept	2015	Université Pierre et Marie Curie, Paris, France
<b>Undergraduate students</b>	Elric Frigerio	2018	Sorbonne Université, Paris, France
	Yosra Adie	2013–2014	UCLA, USA, co-advised with J.O.Lloyd-Smith

## REVIEWING

---

<b>Academic editor</b>	PLOS One
<b>Reviewer</b>	PLOS Computational Biology, Journal of the Royal Society Interface, Royal Society Open Science, MSystems, Journal of statistical Mechanics : Theory and Experiments, Methods in Ecology and Evolution, Journal of Theoretical Biology, Biology Letters
<b>Grant reviewer</b>	ANR, L'Oreal Women in Science

## INSTITUTIONAL RESPONSABILITIES

---

2018	<b>Examiner</b> for the Ph.D. defense of Charles Duchêne; Université Sorbonne Paris Cité, France.
2017–...	<b>Co-organizer of the Laboratoire Jean Perrin Seminar</b> , Sorbonne Université, Paris, France. (weekly, most speakers from outside the lab)
2015–...	<b>Member of the Ph.D. committee</b> of Charles Duchêne (Université Sorbonne Paris Cité), Ido Lavi (Sorbonne Université), and Victor Chardès (École Normale Supérieure)
2019	<b>Co-organization of a meeting session</b> Biology and Fluctuations, in the Congrès Général de la Société Française de Physique, Nantes, France.
2016	<b>Co-organization of a meeting</b> between two labs (Physico-Chimie Curie & Laboratoire Jean Perrin) (about 80 participants)

## GRANTS, AWARDS AND PRIZES

---

2019	Bronze Medal, CNRS
2018–2021	Gebert rüf Stiftung grant (Partner; P.I. : Emma Slack)
2015	CNRS grant PEPS EGALITE - PROJET INTEGER (P.I.)
2013	Childcare travel award, UCLA
2007–2010	3-year full Ph.D. fellowship; French Ministry of Research
2003–2007	4-year full scholarship (civil servant status with full pay); École Normale Supérieure

## TEACHING

---

2018	<b>Teaching assistant in statistical physics</b> ESPCI, Paris, France
2007 – 2010	<b>Teaching assistant for undergraduates in physics</b> Université Pierre et Marie Curie, Paris, France
2005 – 2009	<b>Literacy classes</b> Association du foyer Pinel, Paris, France
2006 – 2007	<b>Tutoring for students in preparatory classes for engineering schools</b> Association Tremplin, Paris, France
2004 – 2005	<b>Tutoring in mathematics for undergraduates</b> Lycée Louis-Le-Grand, Paris, France

## CONFERENCES & WORKSHOPS

---

- 2019 **From Molecular Basis to Predictability and Control of Evolution** Stockholm, Sweden *Talk*
- 2019 **Journées de Physique Statistique** Paris, France *Invited talk*
- 2018 **Mechanotransduction of Host-Pathogen Interactions** Paris, France *Talk*
- 2018 **5ème Journée Biologie & Mathématiques sur la Montagne** Paris, France  
*Invited talk*
- 2018 **Physical concepts and computational models in immunology** Paris, France  
*Poster*
- 2018 **Stochastic Models in Ecology and Evolutionary Biology 2018** Venice, Italy  
*Talk*
- 2017 **Quantitative approaches to antimicrobial resistance** Edinburgh, UK *Poster*
- 2017 **19th IUPAB and 11th EBSA Congress** Edinburgh, UK *Poster*
- 2016 **PhysBio2016** Palaiseau, France *Poster*
- 2016 **STATPHYS26** Lyon, France *Talk*
- 2016 **Statistical physics methods in biology and computer science** Paris, France  
*Talk*
- 2015 **Annual meeting FNRS Graduate School COMPLEX & Sciences of the Cities** Namur, Belgium *Invited talk*
- 2014 **From emerging to pandemic viruses : Interplay between host ecology and viral evolution** Roscoff, France *Talk*
- 2013 **Evolution** Snowbird, Utah, USA *Talk and poster*
- 2012 **Evolutionary Biology Meeting** Marseille, France *Talk*
- 2011 **Epidemics** Boston, USA *Poster*
- 2011 **Ecology and evolution of infectious diseases** Santa Barbara, USA *Poster*
- 2011 **Search and Exploration** Cargese, France *Invited talk*
- 2010 **Biophysical Society Meeting** San Francisco, USA *Poster*
- 2009 **Paris interdisciplinary PhD symposium** Paris, France *Poster*
- 2009 **Congress of the French society of Physics** Palaiseau, France *Talk, 2cd ex-*
- 2009 **Days of statistical physics** Paris, France *Short talk*
- 2008 **Interdisciplinary school of systemic biology** Aspet, France *Invited talk*
- 2008 **SigmaPhi 2008** Kolompary, Greece *Talk*
- 2008 **Workshop : Modeling anomalous diffusion and relaxation** Jerusalem, Israel  
*Poster*
- 2008 **Days of statistical physics** Paris, France *Short talk*
- 2007 **Statphys 23** Genova, Italy *Poster*
- 2007 **Days of statistical physics** Paris, France *Short talk*

## SEMINARS

---

30/09/2019	<b>LPTMC</b> Sorbonne Université, Paris, France
09/04/2019	<b>INRIA</b> Villeurbanne, France
13/03/2019	<b>Groupe de Travail Math-Bio</b> Institut Joseph Fourier, Grenoble, France
16/01/2015	<b>Biophysical seminar</b> ENS/ESPCI, Paris, France
01/04/2014	<b>Laboratoire Jean Perrin</b> UPMC, Paris, France
18/04/2013	<b>Theoretical Biology</b> ETH, Zürich, Suisse
25/09/2012	<b>Lab. Matière et Systèmes Complexes</b> Université Paris 7, France
17/09/2012	<b>Centre de Physique Théorique</b> Aix Marseille Université, Luminy, France
22/11/2011	<b>LPTMS</b> Université Paris 11, Orsay, France
21/11/2011	<b>Laboratoire Charles Coulomb</b> Université Montpellier 2, France
31/05/2011	<b>Worms and bugs seminar</b> University of Cambridge, UK
19/05/2011	<b>Instituto de Biología Molecular y Celular de Plantas</b> Universidad Politécnica de Valencia, Spain
16/05/2011	<b>Centro de astrobiología</b> Instituto Nacional de Técnica Aeroespacial, Torrejón de Ardoz, Spain
25/08/2010	<b>Salman lab</b> University of Pittsburgh, USA
02/03/2010	<b>Widely Applied Mathematics Seminar</b> Harvard, Cambridge, USA
25/02/2010	<b>Lloyd-Smith &amp; Novembre labs</b> UCLA, Los Angeles, USA
13/01/2009	<b>LPTMC “junior” seminar</b> Paris, France

## POPULARIZATION OF SCIENCE

---

2018–...	<b>Fête de la Science</b> Sorbonne Université
2015–...	<b>Interventions in highschools</b> Association Femmes et sciences
2009	<b>Poster on game theory and help to the organization</b> “Darwin 200 ans : entre sciences et humanités”, Ecole Normale Supérieure, Paris, France
2007 – 2009	<b>Interventions in high schools, “1000 ambassadors for women in science”</b> Paris, France
2006	<b>Participation to a science popularization festival</b> Paris-Montagne, Paris, France
2003 – 2004	<b>Courses of physics for high school students eager to learn more</b> Association Tremplin, Paris, France