Natalie MALIKOVA – Curriculum Vitae

Personal details

Nationality:	British and Czech
Date, place of birth:	13th February 1979, Prague, Czechoslovakia
Status:	Married, 3 children (born 2011, 2013 and 2016)
Professional address:	Laboratoire de Physicochimie des Electrolytes et Nanosystèmes Interfaciaux (PHENIX), UMR CNRS-UPMC 8234, Sorbonne Université, Paris, France
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Research keywords

microscopic dynamics, confinement, liquids and ionic solutions, hydrophobicity, polyelectrolytes, ion specific effects, neutron and X-ray scattering, MD simulations, NMR spectroscopy and relaxometry

Qualifications

2015 **Habilitation à Diriger des Recherches**, Université Pierre et Marie Curie (UPMC), Paris, FRANCE

"Competing interactions in aqueous ionic solutions: charge versus hydrophobicity, ion-specificity and confinement effects"
Jury: R. von Klitzing, A. Delville, O. Diat, P. Levitz, D. Morineau, J. Teixeira, M. Saitta

2002 - 2005 **PhD in Physical Chemistry,** UPMC, Paris, FRANCE

"Dynamique de l'eau et des ions dans des argiles de type montmorillonite par simulation microscopique et diffusion quasi-élastique des neutrons"
Jury: P. Levitz, X. Vitard, B. Smit, P. Turq, J.-P. Hansen, S. Longeville, E. Giffaut, A. Fuchs

1998 - 2002 *Clare College, University of Cambridge, UNITED KINGDOM*
2001-2002 **MSc in Chemistry,** option physical and theoretical chemistry
1998-2001 **BSc in Chemistry,** option physical, theoretical and inorganic chemistry

1995-1997 Wallington High School for Girls, Surrey, UNITED KINGDOM
1993-1995 Gymnasium Sladkovskeho, Prague, CZECH REPUBLIC

Research Experience

2010- **Visiting Scientist** in the group of Prof Vojko Vlachy, University of Ljubljana, Slovenia; yearly visits as part of bilateral agreements

2008- **Chargée de Recherche at the CNRS (Section 5)**
2013- affiliated to *Laboratoire de Physicochimie des Electrolytes et Nanosystèmes Interfaciaux* (PHENIX), UMR CNRS-UPMC 8234, Sorbonne Université, Paris, France (dir. L. Michot)
2008-2013 affiliated to *Laboratoire Léon Brillouin* (LLB), UMR CEA-CNRS 12, CEA Saclay, France (dir. C. Alba-Simionesco)

2006 - 2007 **Marie-Curie Fellowship** of the European Commission, *topic: proton-conducting perovskites, neutron scattering,* coll. Dr Chun Loong, Dr Jean-Marc Zanotti, *Laboratoire Léon Brillouin (CEA-CNRS), CEA Saclay, France / Argonne National Laboratory, Argonne, IL, USA*

2002 – 2005 **PhD in Physical Chemistry,** *topic: dynamics in confinement, microscopic simulation and neutron scattering,* dir. P. Turq, funded by ANDRA, *Laboratoire Liquides Ioniques et Interfaces Chargées, UPMC, Paris, France*

PRIZES

2015-2018 research prize of the CNRS **"Prime d'Excellence Scientifique",** awarded annually for a duration of 4 years

2007 co-recipient of **"Le Prix La Recherche" (category Energy)**
poster prize **- 4th European Neutron Scattering Conference,** Sweden
PhD Prize **of the Société Française de la Neutronique**

2005 PhD Prize **of the Groupe Français des Argiles**

2002 Clare College (University of Cambridge) prize for Chemistry

Contracts

- **Laboratoire Commun de Rercherche CARMEN** *"Caractérisation des Matériaux pour les énergies nouvelles"* **2019-2024** – partners: CNRS, ENS de Lyon, IFP Energies Nouvelles, Sorbonne Université, Université Claude Bernard Lyon 1, Université de Strasbourg; coord. PHENIX - P. Levitz; funding for 4 PhDs of which one directed by N. Malikova in PHENIX (2019-2022), 4 postdocs, 3 M2 students
- 80 | Prime of CNRS **2019**, project TRAPEUR, partners: PHENIX at Sorbonne Université and IPCMS of Université de Strasbourg (coord. P. Levitz, PHENIX), *"Transport moléculaire et colloïdal dans des milieux poreux multi structurés: Etudes in situ couplant échelles temporelles et spatiales"*, 18k€
- **ANR PRC** MOVE YOUR ION (coord. S. Lyonnard, CEA Grenoble), **2020-2024**, 42 months, 550k€, *"How do ions move in self–assembled ionic structures?"* – PHENIX partner involved in NMR relaxometry, molecular dynamics simulations and neutron scattering components
- coordinator of a long-term French-Slovenian collaboratory research (U. of Ljubljana), **since 2011**; past funding: PHC Proteus, CEA-MHEST (2011-2013, 15k€), PICS of CNRS (2016-2018, 15k€), to date 2 shared PhDs and 1 post-doc
- coordinator of an **instrumental project** concerning the purchase of an **isothermal titration calorimetry apparatus**, for the use within the **DIM RESPORE** network in the Paris intra-muros region (3 participating laboratories: PHENIX, LCMCP, IPMC of Sorbonne University), project **accepted in 2018**, apparatus purchased in autumn 2019, overall budget: 100k€
- **Marie-Curie Fellowship** of the European Commission, a 2-year post-doctoral project between the Argonne National Laboratory in the USA and the Laboratoire Léon Brillouin (CEA-CNRS, Saclay) in France **(2006-2008)** on the topic of neutron scattering studies of proton-conducting materials.
- **ANR Jeune chercheur** (DYPOLYPO, coord. Marie Jardat, **2009-2012**)

Recent funding applications

- **DIM (Domaine d'Intérêt Majeur) RESPORE,** funding of Ile de France, post-doc funding on the theme of *Role of compensating ions in aggregation pathways of clay colloids,* **2019, project on complementary list**
- **Labex MATISSE,** post-doc funding on the theme of *Role of ion-specific effects in aggregation pathways of clay colloids,* **2019**

- coordinator of **ANR Jeune chercheur** CALGIS - *Tuning Colloidal Aggregation in Liquids and Gels: role of Ion-Specificity* (**2016, 2017, 2018, 2019**), 280k€ – on **complementary list in 2017**
- **ANR Jeune chercheur** PYNTHE (coord. V. Dahirel, PHENIX) - *Polyelectrolytes : new approaches coupling experiments and theory* (**2018**)
- **Emergences of CNRS**, project HELIOS, post-doc funding on the theme of *Tuning hydrogels via ion-specific effects*, **2018**
- **Fondation de la Maison de la Chimie,** post-doc funding on the theme of *Ionene-based hydrogels modified by clay additives*, **2017**, **project on complementary list**
- **Emergences Ville de Paris** *Tuning Colloidal Aggregation in Liquids and Gels: role of Ion-Specificity,* 280k€, **2017**
- **ANR PRC** ConvectionMetalLiq (coord. D. Funfschilling, U. of Strasbourg) - *Rhéologie des métaux liquides proche du point de fusion: applications aux mécanismes de convection lors de la solidification* (**2015, 2016**)

Research management and expertise

Responsibilities within laboratory

- Elected member of the **Conseil du Laboratoire** (PHENIX), **2014-2019**
- Referent for BIATTS personnel of Sorbonne University, **2018-**
- Organizer of **"Series of courses PHENIX"** – internal training scheme of the laboratory, **2015-**
- scientific responsible for PHENIX laboratory within **GDR Solvate**, **2017-**
- representing PHENIX in the **GIS Géosciences Franciliennes, 2017-**
- Nominated member of the **Conseil du Laboratoire** (LLB) (2009-2011)

Committee membership

- Selection committee for position **MdC ENS Paris in theoretical chemistry**, **2019**.
- Selection committee of **Federation Française de la Diffusion Neutronique** (F2DN), **2018-**
- Selection committee for **Prix de These** of Société Française de la Neutronique (SFN), **2018, 2019**
- **Scientific advisory committee** for the upgrade of spectrometer NEAT (Dr M. Russina), Helmholtz–Zentrum Berlin für Materialien und Energie, Berlin, GERMANY, **2012-2019**
- Selection committee for position **"Chaire Université de Paris Sud – CEA"**, theme of *"Modélisation en phase condensée: forces intermoléculaires et propriétés de transport"*, **2010.**

Activity in scientific societies

- Elected as secretary of the **European Neutron Scattering Association (ENSA)**, **2019-**
- **Chargé de mission** of the Société Française de la Neutronique (SFN) at **ENSA**, **2015**-
- Representing SFN at the **"Sociétés Savantes Academiques de France"**, **https://societes-savantes.fr/, 2018-**
- Elected member of the **Conseil d'Administration of the SFN** (2010-2013).

Editorial and Referee activity

- **Guest editor** for Journal of Molecular Liquids; **2016**
- **Co-editor** of **"Neutrons et Simulations":** collection of invited articles, EDP Sciences, *Collection SFN,* Volume 12, **2011**.
- **Referee of research proposals:** National Institute for Standards and Technology (Washington DC, USA), Czech Academy of Science, Swiss National Science Foundation.
- **Member of PhD juries**

  Azad Erman **(2019)**, Université Paris-Est, Rapporteur
  Marie Haddou **(2019),** Université de Bordeaux, Rapporteur
  Ramona Mhanna **(2015),** Université de Rennes, Rapporteur
  Romain Jonchiere **(2013),** Université Pierre et Marie Curie, Member

Organisation of workshops and conferences

- Workshop **"New Challenges in Polyelectrolyte Science"**, Sorbonne University, Paris, planned for **July 2020.**
- Mini-colloquium entitled **« La diffusion neutronique: de l'état de l'art aux nouvelles sources »**, Journees de la Matiere Condensee**,** Grenoble, 27-31 August **2018.**
- National meeting **"Neutrons, Sciences et Perspectives"** of the SFN, Batz-sur-Mer (Loire - Atlantique), 6-10 June **2011**.
- **Ecole Thématique** on the theme of **"Neutrons and Simulations"** within the framework of yearly schools of the SFN: 56 participants and 16 lecturers, Remuzat (Drome), 4-8 June **2010**.
- **7emes Rencontres Scientifiques LLB-Soleil "Confinement et Nano-systèmes"**, 12-13 March **2009**, Synchrotron Soleil, France.
- Member of the local organisation committee for the **XVIII International Conference on Horizons in Hydrogen Bond Research**, Paris, France, 14-18 September **2009**.

Supervision / direction (PhD, post-doc and M2)

(1) **Sivagen VYDELINGUM** (graduate of SU, Paris) – PhD director, PHENIX, SU **2019-**
"Molecular and Colloidal Transport in Multi-scale Porous Media"

(2) **Claire HOTTON** (graduate of ENSCR, Rennes) - PhD director, PHENIX, SU **2018-**
"Polyelectrolytes: from solutions to gels"

(3) **Tadeja JANC** (PhD from U. of Ljubljana) – post-doc at PHENIX, SU **2018-2019**
"Water dynamics and salt-specific effects in protein solutions as seen by NMRD"

(4) **Yasmina BOUHARICHA** (UPMC) - M2 project supervisor, PHENIX **2018**
"Hydrogels based on charged polymers"

(5) **Mesut DEMIRELLI** (grad. UPMC) - PhD co-supervisor, PHENIX, dir. J. Fresnais **2017-**
"Electrostatic complexation in salty media: study of the ionicity in ionic liquids"

(6) **Tadeja JANC** (grad. U. of Ljubljana), PhD co-supervisor, U. of Ljubljana, Slovenia, dir. V. Vlachy / M. Luksic **2014-2018**
"Influence of salts and other additives on self-association of globular proteins in aqueous solutions"

(7) **Yasine SAKHAWOTH** (grad. UPMC) - PhD director, PHENIX, **2014-2017**
"Floculation – Formation et structure des agrégats entre les chaînes de polyélectrolytes et colloïdes argileux"

(8) **Jamoowantee BALLAH** (grad. UPMC) - PhD co-supervisor, PHENIX, dir. L. Michot, **2013-2017**
"Wettability of clay films and triple water-oil-clay phases"

(9) **Salem BOUTEGHMES** (UPMC) - M2 project supervisor, PHENIX **2015**
"Aqueous solutions of model polyelectrolytes"

(10) **Saso CEBASEK** (grad. U. of Ljubljana) – PhD co-supervisor, U. of Ljubljana, Slovenia, dir. V. Vlachy **2009-2013**
"Influence of polyion density and nature of counterion on the physical and chemical properties of ionene solutions"

(11) **Debsindhu BHOWMIK** (graduate of Jadavpur University, Kolkata, India) – principal PhD supervisor, Laboratoire Leon Brillouin (LLB) and UPMC, dir. P. Turq **2008-2011**
"Aqueous solutions of hydrophobic ions studied by neutron scattering and microscopic simulations"

(12) **Vincent GLENISSON** (ENSCBP in Bordeaux) – M2 project supervisor, LLB **2010**
"Synthesis of ionenes – model hydrophobic polyelectrolytes"

Teaching Experience

I have been involved in teaching at all levels of the university system (Bachelor, Master and PhD), giving courses in English, French, as well as Czech.

2009- Level **Master**: Erasmus Mundus Master – *International Master in Advanced Clay Science***,** University of Poitiers, Module **"Molecular Modelling"** of 28 hours in total, My contribution: Lectures 4h, practicals (travaux pratiques) 10h (in English). **Responsible of module since 2014.**

2014-2016 Level **Bachelor**: Scheme "referent" at UPMC: personalised help for 1st year Bachelor students, 12h TD equivalent per year (TD = examples classes).

2012 Level **Master**, *courses in chemistry* (Lectures and Examples Classes) at the ECE Ecole d'Ingenieur (previously Ecole centrale d'électronique), Paris, 16eme arr. Topics covered: thermodynamics, reactions kinetics, electrochemistry (in English).

2009, 2012 Level **PhD,** neutron scattering course *FAN du LLB*, Laboratoire Leon Brillouin. My contribution: practical courses using the Neutron Spin Echo technique (in French)

2009, 2010 Level **PhD**, *Programme HERCULES* (Higher European Research Course for Users of Large Experimental Systems)**,** Laboratoire Leon Brillouin. My contribution: practicals 12h (2009) and 8h (2010) (in English).

2003-2004 Level **Bachelor**, courses of programming (fortran) for undergraduate natural science students at Université Paris 13, Paris, FRANCE (in French)

2002 Level **Master/PhD**: Series of courses 'English for Chemists', Key Laboratory for Supramolecular Structure and Spectroscopy, Jilin University, Changchun, PR CHINA (invited by *Professor Xi Zhang*). (2 months)

Science and general public

2019, 2014 Organisation of a **1-week visit of high school students to PHENIX** laboratory (introduction to various experimental techniques, simple practical activities, visit of expositions on the University campus).

2018 **Declics 2018** (Lycée Stanislas, Paris, 75006, ½ day) – participation in the nation-wide action organising **meetings between scientists and high-school students**

2011 **Science lessons in Primary School** (10 rue Saint Lambert, Paris, 75015). A series of 3 one-hour courses in two CM2 classes (*2*25 children, 10/11*

years of age, 6 hours in total). The themes were **"Les Atomes", "La Lumière"** and **"Le Tableau Périodique"**.

2009 **Knoxville, US** - interview with *Frank Grotelueschen*, a science journalist for the **National German Radio** (Deutschlandfunk), on the topic of clay science and its link to radioactive waste disposal.

Current scientific collaborations

Within PHENIX laboratory

- Anne-Laure Rollet (CR)
- Guillaume Meriguet (MdC)
- Juliette-Sirieix Plenet (MdC)
- Jerome Fresnais (CR)
- Vincent Dahirel (CR)
- Veronique Peyre (MdC)
- Laurent Michot (DR)
- Pierre Levitz (DR)
- Ali Abou-Hassan (MdC)
- Jean-Pierre Korb (DR-emeritus)

National and International

- Ovidiu Ersen, IPCMS, U. of Strasbourg
- Thibaud Chevalier, IFPEN, Rueil-Malmaison
- Francois Ribot, LCMCP, Sorbonne Université, Paris
- Frédéric Nallet, CRPP, Université de Bordeaux
- Eric Ferrage, IC2MP, U. of Poitiers
- Sandrine Lyonnard, CEA Grenoble
- Margarita Russina, HZB, Berlin, Germany
- Vojko Vlachy, U. of Ljubljana, Slovenia
- Miha Luksic, U. of Ljubljana, Slovenia
- Matija Tomsic, U. of Ljubljana, Slovenia
- Barbara Hribar-Lee, U. of Ljubljana, Slovenia
- Maksym Druchok, Inst. Condensed Matter Physics, Lviv, Ukraine
- Robert G. Bryant, University of Virginia, USA