

Maureen Clerc

resume, November 2013.

Maureen Clerc (née Gallagher)
INRIA - Athena project-team
2004 route des Lucioles
06 902 Sophia Antipolis, France

ingénieur en chef des Ponts et Chaussées
French citizen
date of birth June 17, 1971
married, three daughters (1997, 2000, 2003).

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Domains of expertise

Applied mathematics: Signal and image processing - Wavelet analysis - Non-stationary stochastic processes - Finite and Boundary Element Modeling.

Biomedical engineering: Inverse problems in brain imaging - Electro- and magneto-encephalography. Electrophysiological simulation - Brain Computer Interfaces.

Appointments

- 2009** Research director at INRIA, in the Athena project-team.
- 2004** Permanent researcher at CERTIS, ENPC, in the Odyssee project-team, joint between ENPC-ENS-INRIA.
- 2001** Permanent researcher at CERMICS, ENPC, first in Champs-sur-Marne and after in Sophia Antipolis, in the Odyssee project-team, joint between ENPC-ENS-INRIA.
- 1999-2000** Postdoc in the Departement of Statistics at Stanford University, with Pr. David Donoho.
- 1996-1999** PhD thesis at the Applied Mathematics Center of Ecole Polytechnique, and at CERMICS, ENPC, advisor Stéphane Mallat.
- 1994-1995** Internship at INRIA Rocquencourt, MENUSIN project and at Dassault Aviation with Pr. Patrick Le Tallec and Dr. Michel Mallet.
- 1993** Internship at UCLA, Department of Atmospheric Sciences with Pr. Michael Ghil.

Educational Degrees

2007 : Habilitation à diriger des recherches from Nice Sophia Antipolis University.

1999 : PhD in Applied Mathematics from École Polytechnique

1996 : Engineer of the “Corps des Ponts et Chaussées”.

1995 : Masters in Numerical Analysis, University Paris 6, highest honors.

1993 : Engineer of the École Polytechnique.

Prizes and awards

- Best thesis prize from EADS foundation awarded to PhD student Alexandre Gramfort, 2010.
- Best thesis prize from École Polytechnique, 2000.
- Prize for best internship from École Polytechnique, 1993.

Teaching

since 2010 Course on “*Fourier Analysis*” in the Applied Math MSc, Ecole Polytechnique Universitaire Nice Sophia Antipolis.

since 2009 Course on “*Inverse Problems in Brain Imaging*” MSc Computational Biology, Université de Nice Sophia Antipolis.

2012 PhD course Optimization and Inverse problems, Universiteit Ghent: Inverse Problems in Brain Imaging.

2008 Interregional Neuroimaging school “Source localization by MEG/EEG” INSERM-CNRS.

2007-2009 In charge of the module “Immersion mathématique et informatique” at Ecole des Ponts.

2007 Course at a UNESCO school (ENIT, Tunis).

2005-2010 Course at ENS Cachan, MVA MSc: “Inverse Problems in Brain Imaging”.

2002-2009 In charge of the module “*Fourier Analysis and applications*” at Ecole des Ponts.

2001-2003 In charge of the course “Mathematics and Vision” at Ecole des Ponts.

1998-1999 Matlab Labs (Analysis, Ecole des Ponts)

1998 Wavelet course with WaveLab (engineering college, École Polytechnique)

1996 Undergraduate classes at Université de Versailles-Saint Quentin.

Scientific responsibilities

Project coordination

- French National grant (ANR DEFIS) Co-Adapt, on “Brain-Computer Co-adaptation for better interfaces” (2009-2013)
- Biomedical research protocol INSERM 2008-A00434-51 “In vivo measurement and influence of the electromagnetic conductivity of head tissues on the localization of intracerebral generators in partial epilepsy.”
- Setup of an EEG laboratory at INRIA Sophia Antipolis Méditerranée, financement CPER Telius (2008-2011), approved by the Regional Health Agency for 2011-2015.
- Bilateral grant with Max Planck Institute, Leipzig (2006-2007).
- Bilateral grant with Czech Technical University, Prague (2006-2007).
- Collaboration with laboratoire de Neurophysiologie et Neuropsychologie de La Timone, Marseille, on head conductivity estimation in EEG (2005-2006).
- French National grant (ACI Masse de Données) OBS-CERV, on “Non-invasive observation of the brain by MR and MEG-EEG” (2003-2006).

Project participation (other than the above):

- Hemisfer project of Labex Comin labs (2013-2017).
- French National grant VIBRATIONS (2014-2018).
- French National grant ANR Multimodel (2010-2014).
- INSERM-INRIA grant “Models and interpretation of multimodal data (EEG, MEG, IRMf). Application to epilepsy” (2008-2009)
- French National grant ANR ViMAGINE (2007-2011)
- INRIA grant Color MedMesh (2007)
- EADS Foundation grant (2006-2009)
- INRIA grant ARC HeadExp (2003-2004)
- INRIA grant ARC Dir-Inv (2001-2004)
- EU grant Insight2+ (2001-2004)

Participation in committees:

- Member of the “bureau du Comité des Projets” at INRIA Sophia Antipolis since 2010.
- Member of an evaluation committee for the French Research Agency (ANR) since 2013.
- Organizer of a CEA-EDF-INRIA school, “Cardiac and Brain Electrophysiology: modeling and simulation”, november 2009.
- Member since 2008 of the Program committee of the RFIA conference.
- Member (2008-2011) of the committee for the EADS Foundation Best Thesis prize.
- Member (2007-2010) of the committee of Informatics usage at INRIA Sophia Antipolis Méditerranée.
- Member since 2005 of the operational committee of the MEG center of Marseille.
- Juries for recruiting researchers at Inria and assistant professors at Universities (Nice, Grenoble).

- PhD theses jurors of: Corentin Massot (université de Grenoble, examinatrice), Cédric Gouy-Pailler (université de Grenoble, rapportrice), Boris Mailhé (université de Rennes, rapportrice), Alexandre Baratchant (université de Grenoble, rapportrice), Margaux Perrin (université de Lyon, rapportrice), Djano Kandaswamy (EPFL), Emilie Villaron (Aix-Marseille Université, rapportrice), Sandra Rousseau (Université de Grenoble), Maxime Rio (Université de Lorraine), Janis Hofmanis (Université de Lorraine).

Editorial:

- Editor of BioMedical Engineering OnLine
- Associate editor for ISTE-Wiley book series.
- Referee for journals:
Annals of Statistics, Biomedical Engineering Online, Bulletin de la Société Mathématique Belge, IEEE Transactions on Pattern Analysis and Machine Intelligence, IEEE Transactions on Biomedical Engineering, IEEE Transactions on Image Processing, IEEE Transactions on Medical Imaging, International Journal of Computer Vision, IEEE Transactions on Comput Intell and AI in Games, Inverse Problems, Journal of Applied Physics, Journal of Statistical Planning and Inference, NeuroImage, Pattern Recognition Letters, Physiological Measurement, Journal of Neuroscience Methods, Journal of Behavioral Robotics.
- Referee for conferences:
RFIA, IEEE EMBS, International Conference on Biomagnetism, NIPS, MICCAI, ICPR...

Supervision

PhD theses

- Geoffray Adde (Ecole des Ponts grant, 2002 to 2005, cosupervised with O. Faugeras and R. Keriven).
- Sylvain Vallaghé (Ministry of Research grant, 2005 to 2008).
- Alexandre Gramfort (Corps des Télécom, 2007 to 2009).
- Emmanuel Olivi (PACA Regional Council grant since 2008).
- Joan Fruitet (Allocataire Moniteur Normalien grant, 2009 to 2012).
- Romain Trachel (DGA grant, since 2010, cosupervised with T. Brochier).
- Anne-Charlotte Philippe (PACA Regional Council grant, since 2010, cosupervised with R. Deriche).
- Sebastian Hitziger (PACA Regional Council Grant, since 2011, cosupervised with T. Papadopoulo).
- Kai Dang (PhD CIFRE grant with Neurelec company), since 2013.

Post-docs

- Jan Kybic (2002 to 2003, cosupervised with O. Faugeras).
- Christian Bénar (2005 to 2006).
- Sabir Jacquir (2006 to 2007).
- Laurent Koessler (2007 to 2009, cosupervised with J-M Badier, La Timone).
- Nicole Voges (2009 to 2010, cosupervised with C. Bénar).
- Eoin Thomas (2011 to 2013).

Animation and diffusion

Animation

- Member of the Organization Committee of the International Conference on Biomagnetism, Paris, 2012.
- Member of the committee for scientific animation of the INRIA Sophia Antipolis research center.
- Animation (2007-2010) of a research group “Signal-MEEG” of approximately forty researchers and engineers in region Provence-Alpes Côte d’Azur.
- Animation of a research group on MEEG at the CEMRACS, summer 2004 (CIRM, Luminy).
- Minisymposium organization at AMAM (Applied Mathematics and Applications of Mathematics), Nice , Feb. 10-13 2003.

Diffusion

- Conference “Art Science Pensée”, september 2012.
- Organization of an event at Masséna high school, Nice for the 40th anniversary of women’s admission to Ecole Polytechnique, september 2012.
- Article in 20 Minutes, Nice edition, March 2011.
- BCI interview, available on YouTube.
- Coordination of an issue of Inédit (INRIA) July 2009 on new Human-Machine Interfaces.
- TIPE Sciences de la Vie (1ère S Lycée Masséna), 2009.
- Conference at Masséna high school, Nice, 2008.
- LISA numéro 13, 2008.
- Web page on [interstices](#) “Observation du cerveau par imagerie fonctionnelle”, 2008.
- Participation in a movie on MEG (INRIA), 2007.
- Article in Nice-Matin, March 2006 “Débusquer l’épilepsie à crâne fermé”.

Technological development

- Initiator and senior developer of the **OpenMEEG software** (Boundary Element Methods, Forward Problems in Bioelectromagnetism, 30000 lines / C++, Cecill-B license), now integrated within FieldTrip and Brainstorm.
- Participation in OpenViBE (BCI software platform / C++) with Hybrid, Potioc and Neurosys Project teams.
- Participation in FindSources3D (Rational Approximation, Inverse Problems / Matlab), with APICS Project team et CMA Ecole des Mines.
- In charge of building the Inria Sophia Antipolis Electroencephalography laboratory, since 2006 (approved by the PACA Regional Health Board in December 2010).
- Participation in WaveLab (wavelets, signal processing / Matlab), with Stanford University.

Publications

• Journal articles

- Eoin Thomas, Joan Fruitet, **Maureen Clerc**. “Combining ERD and ERS features to create a system-paced BCI”, *Journal of Neuroscience Methods*, vol. 216, no. 2, 2013.
- Eoin Thomas, Matthew Dyson, **Maureen Clerc**. “An analysis of performance evaluation for motor-imagery based BCI”, *Journal of Neural Engineering*, vol 10, 2013.
- Joan Fruitet, Alexandra Carpentier, Rémi Munos, **Maureen Clerc**. “Automatic motor task selection via a bandit algorithm for a brain-controlled button”, *Journal of Neural Engineering*, vol 13(1), 2013.
- **Maureen Clerc**. Review of “Brain-Computer Interfaces, principles and practise”, edited by Jonathan R. Wolpaw and Elizabeth Winter Wolpaw, *BioMedical Engineering OnLine*, vol 12(22), 2013.
- **Maureen Clerc**, Juliette Leblond, Jean-Paul Marmorat, Théodore Papadopoulo. “Source localization using rational approximation on plane sections”, *Inverse Problems*, 2012 (to appear).
- Alexandre Gramfort, Théo Papadopoulo, Emmanuel Olivi, **Maureen Clerc**, “Forward Field Computation with OpenMEEG“, *Computational Intelligence and Neuroscience*, 2011.
- Alexandre Gramfort, Théo Papadopoulo, Sylvain Baillet, **Maureen Clerc**, “Tracking cortical activity from M/EEG using graph-cuts with spatiotemporal constraints”, *NeuroImage*, vol. 54, no. 3, pp. 1930-1941, 2011.
- Benoit Cottureau, Jean Lorenceau, Alexandre Gramfort, **Maureen Clerc**, Bertrand Thirion, Sylvain Baillet, “Phase delays within visual cortex shape the response to steady-state visual stimulation”, *NeuroImage*, vol. 54, no. 3, pp. 1919-1929, 2011.
- Nicole Voges, Solenna Blanchard, Fabrice Wendling, Olivier David, Habib Benali, Théo Papadopoulo, **Maureen Clerc**, Christian Bénar, *Modeling of the Neurovascular Coupling in Epileptic Discharges*, *Brain Topography*, 2011.
- Solenna Blanchard, Théo Papadopoulo, Christian-George Bénar, Nicole Voges, **Maureen Clerc**, Habib Benali, Jan Warnking, Olivier David, Fabrice Wendling “Relationship Between Flow and Metabolism in BOLD Signals: Insights from Biophysical Models”, *Brain Topography*, pp. 1-14, published online November 2010.
- Alexandre Gramfort, Théo Papadopoulo, Emmanuel Olivi, **Maureen Clerc**. “OpenMEEG: opensource software for quasistatic bioelectromagnetics”, *BioMedical Engineering OnLine* 9:45, 2010.
- Alexandre Gramfort, Renaud Keriven, **Maureen Clerc**. “Graph-based variability estimation in single-trial event-related neural responses”, *IEEE Transactions on Biomedical Engineering*, vol. 57, no. 5, 1051-1061, 2010.
- Christian Bénar, Théo Papadopoulo, Bruno Torrèsani, **Maureen Clerc** “Consensus Matching Pursuit for Multi-Trial EEG Signal”, *Journal of Neuroscience Methods*, vol. 180, pp. 161-170, 2009.
- Sylvain Vallaghé, **Maureen Clerc** “A global sensitivity analysis of three and four-layer EEG conductivity models”, *IEEE Transactions on Biomedical Engineering*, vol. 56, no. 4, pp. 988–995, 2009.
- Sylvain Vallaghé, Théo Papadopoulo, **Maureen Clerc** “The adjoint method for general EEG and MEG sensor-based lead field equations”, *Physics in Medicine and Biology*, vol. 54, pp. 135–147, 2009.
- **Maureen Clerc**, Jan Kybic “Cortical mapping by Laplace Cauchy transmission using a boundary element method”, *Inverse Problems*, vol. 23, pp. 2589-2601, December 2007.
- Jan Kybic, **Maureen Clerc**, Olivier Faugeras, Renaud Keriven and Théo Papadopoulo “Generalized head models for MEG/EEG: boundary element method beyond nested volumes”, *Physics in Medicine and Biology*, vol. 51, pp. 1333–1346, March 2006.

- Jan Kybic, **Maureen Clerc**, Olivier Faugeras, Renaud Keriven, Théo Papadopoulo, “*Fast Multipole Acceleration of the MEG/EEG Boundary Element Method*”, Physics in Medicine and Biology, vol. 50, pp. 4695–4710, October 2005.
 - Jan Kybic, **Maureen Clerc**, Toufic Abboud, Olivier Faugeras, Renaud Keriven, Théo Papadopoulo, “*A Common Formalism for the Integral Formulations of the Forward EEG Problem*”, IEEE Transactions on Medical Imaging, vol. 24, pp. 12-28, January 2005.
 - Olivier Faugeras, Geoffray Adde, Guillaume Charpiat, Christophe Chedf’Hotel, **Maureen Clerc**, Thomas Deneux, Rachid Deriche, Gerardo Hermosillo, Renaud Keriven, Pierre Kornprobst, Jan Kybic, Christophe Lenglet, Lucero Lopez-Perez, Théo Papadopoulo, Jean-Philippe Pons, Florent Ségonne, Bertrand Thirion, David Tschumperlé, Thierry Viéville, Nicolas Wotawa, N., “*Variational, geometric, and statistical methods for modeling brain anatomy and function*”, NeuroImage, vol. 23S1, pp S46-S55, 2004.
 - **Maureen Clerc**, Stéphane Mallat, “*Estimating deformations of stationary processes*”, Annals of Statistics, vol. 31, no.6, December 2003.
 - **Maureen Clerc**, Stéphane Mallat, “*The texture gradient equation for recovering Shape from Texture*”, IEEE Transactions on Pattern Analysis and Machine Intelligence, April 2002, vol. 24, no.4, pp. 536-549.
- **Theses**
 - *Brain Functional Imaging: simulation, calibration and estimation*, Habilitation à diriger des recherches, Nice Sophia Antipolis university, November 2007.
 - *Etude des processus localement dilatés, et application au gradient de texture*, thèse de l’Ecole Polytechnique, spécialité Mathématiques Appliquées, September 1999.
- **Books or book chapters**
 - **Maureen Clerc**, Théodore Papadopoulo, Christian Bénar, *Single-Trial Analysis of Bioelectromagnetic Signals: The Quest for Hidden Information*, in “Modeling in Computational Biology and Biomedicine: A Multidisciplinary Endeavor”, Cazals and Kornprobst, Eds, Springer Verlag, 2013.
 - Jan de Munck, Carsten Wolters, **Maureen Clerc**, “*EEG & MEG: forward modelling*”, in “Handbook of Neural Activity Measurement”, Destexhe and Brette, Eds, Cambridge University Press, 2012.
 - **Maureen Clerc**, Stéphane Mallat, “*Shape from Texture and Shading with Wavelets*”, in “Dynamical Systems, Control, Coding, Computer Vision”, Progress in Systems and Control Theory vol. 25, pp.393-417, Birkhäuser 1999.

Conferences delivered

- **Seminars and invited conferences**
 - Biomedical Engineering Department, McGill, Montreal, September 2013.
 - Dipartimento di Matematica, Università di Genova, September 2013.
 - Séminaire Probabilités Statistiques, Nice, September 2011.
 - Institute of Bioengineering, EPFL, Lausanne, May 2011.
 - Séminaire Image, Paris 6, March 2011.
 - INSERM 1028 Bron, February 2011.
 - Marseille CNRS, September 2010.
 - Workshop “Dictionary of Atoms”, Montreal, September 2009.
 - Colloquium Jean Kuntzmann, Grenoble, June 2008.
 - Vrije Universiteit Amsterdam, July 2007.

- Statistics Seminar, Montpellier, May 2007.
- Statistics Seminar, Toulouse 3, December 2006.
- SMAI conference on Statistical and Stochastic Modeling, Lille, September 2006.
- Séminaire du GREMAQ, Université Toulouse 1, June 2005.
- Groupe de Travail Problèmes Inverses, Centre de Mathématiques Appliquées, Ecole Polytechnique, January 2005.
- Journée du Groupe Spatial, Institut National d’Agriculture Paris-Grignon, June 2004.
- Colloquium de Mathématiques Appliquées de Grenoble, May 2003.
- Séminaire Contrôle et Identification INRIA Sophia Antipolis, March 2003.
- Séminaire de Probabilité et Statistiques d’Orsay, March 2002
- Statistiques à l’Ecole Normale, April 2002.
- Séminaire de Mathématiques Appliquées, Université de Bordeaux, November 2001.
- Berkeley Vision group, April 2000.
- Stanford VisLunch, March 2000.
- Stanford Applied Math Seminar, February 2000.
- Groupe de travail sur les processus gaussiens, Université de Versailles Saint Quentin, May 1997.

International Conferences

- Keynote address Interspeech International conference, Lyon, August 2013.
- MICCAI, Nice, September 2012.
- International Conference on Biomagnetism, Paris, August 2012.
- International Conference on Electrical Impedance Tomography, Bath, May 2011.
- 17th International Conference on Biomagnetism, Dubrovnik, April 2010.
- 20th International Conference on Information Processing in Medical Imaging (IPMI 2007), Kerkrade, the Netherlands, July 2007.
- International Symposium on Biomedical Imaging (ISBI 2007), Washington DC, May 2007.
- 12th Human Brain Mapping conference (HBM 2006), Florence, juin 2006.
- The 16th Meeting of the International Society for Brain Electromagnetic Topography (ISBET 2005), Bern, October 2005.
- Joint Meeting of 5th International Conference on Bioelectromagnetism and 5th International Symposium on Noninvasive Functional Source Imaging, Minneapolis, May 2005.
- International Conference on Current Advances and Trends in Non-Parametric Statistics, Crete, July 2002.
- International Conference on Computer Vision, Kerkyra, Grèce, September 1999.
- International Wavelet Conference, Tanger, Maroc, April 1998.
- Third ECCOMAS Conference on Computational Fluid Dynamics, Paris, September 1996.

• **Other conferences**

- Institute of Mathematical Statistics Annual Meeting, Park City, USA, July 1997.
- XXIX Journées de Statistiques, Carcassonne, April 1997.

• **Workshops**

- IEEE-EMBS Forum Grand Challenges in Neuroengineering, May 2010.
- CRM-INRIA-MITACS meeting, Montreal, May 2008.
- INRIA-INSERM meeting, Saint Germain en Laye, September 2007.
- NIH-INRIA workshop, Bethesda, May 2007.
- 3rd Conference on Inverse Problems, Control and Shape Optimization (PICOF '06), Nice, April 2006.

- Colloque Autosimilarité et Applications, Toulouse, France, June 2005.
- Applied Mathematics and Applications of Mathematics, Nice, France, February 2003.
- Minisymposium Shape from Texture, Louvain, Belgique, May 2002.
- Deuxième Rencontres de Statistiques Mathématiques, Luminy, December 2001.
- Wavelet IDR Workshop, Florham Park, USA, October 1999.
- Wavelets and Applications Workshop, Ascona, Suisse, October 1998.

Computing skills

- Programming languages: Fortran, C, C++, Matlab, Scilab, Python.
- Operating Systems: Linux/Unix, Windows.

Language skills

French, fluent; **English**, fluent; **German**, good knowledge; **Japanese**, elementary knowledge.