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Epouse : **Constantin de Magny**



MIVEGEC, ‘Maladies Infectieuses et Vecteurs :

Ecologie, Génétique, Evolution et Contrôle

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Keywords: *Ecology of infectious diseases, epidemiology, South countries, , prevention, impact of vaccination, spatial and temporal dynamics, comparative analysis, seasonality, periodicity, pertussis, measles, meningitis,*

EDUCATION AND QUALIFICATIONS

- 2010- **Researcher-CNRS**, MIVEGEC, Centre IRD of Montpellier, France.
- 2007-10 **Post-doctoral researcher**, Division of International Epidemiology and Population Studies, Fogarty International Center, National Institutes of Health, US.
- 2005 **Post-doc**, Institut de Recherche pour le Développement (IRD), Montpellier, France.
- 2000-04 **PhD** in *Ecology of Infectious Diseases*, University of Montpellier, France.
- 2004 “**Diplôme d’Université**” in *Epidemiology*, University of Lyon, France.
- 2000 **MSc** of *Parasitology*, University of Lille and University of Montpellier, France.
- 1999 **BSc** “Biología Sanitaria” – European program **ERASMUS**. Universidad Complutense de Madrid, Spain.

Languages: **French** (mother tongue), **Spanish and English** (fluent)

GRANTS AND AWARDS

- 2007-2009 NIH post-doc fellow
- 2008 WHO grant – 60000\$ - 2 years
- 2006 Award winner of the “le Monde de la Recherche Universitaire” price for my PhD research.
- 2004 PhD Grant from “Fondation des Treilles”
- 2002-03 PhD Grant from Aventis-Pasteur (now Sanofi-Pasteur)

PREVIOUS EMPLOYMENTS AND VISITS

EPIDEMIOLOGY and INFECTIOUS DISEASES DYNAMICS

- 2007-10 Post-doctoral position / Supervisors: **Dr M.A. MILLER, Dr C. VIBOUD**
Topics: Seasonality and periodicity of infectious diseases; impact of vaccination.
Fogarty International Center, NIH, Bethesda, USA
- 2005 (1 year) Post-doctoral position / Supervisor: **Dr J.F. GUEGAN**
Topics: Spatio-temporal dynamics of meningitis in Africa: from local to global approach.
Infectious Diseases Genetics and Evolution, IRD, Montpellier, France
- 2000-04 (4 years) PhD / Supervisors: **Dr F. SIMONDON and Dr J.F. GUEGAN**
Topics: eco-epidemiology of two vaccine preventable diseases: dynamics, persistence and spread of pertussis and measles; impact of vaccination.
« Epidemiology and Prevention » team and GEMI, IRD, Montpellier, France
- 2002-03 (2 months) Visits for collaborations / Supervisor: **Dr P. ROHANI**
Topics: comparative analyses of pertussis and measles dynamics in a rural area in Senegal (Niakhar) and in England and Wales.
Institute of Ecology, University of Georgia, Athens, USA
- 2001 (1 week) Visit for collaborations / Supervisor: **Pr B.T. GRENFELL**
Topics: pertussis dynamics in Senegal in comparison with England and Wales.
Department of Zoology, University of Cambridge, UK

FIELD WORK and LAB TRAININGS

- 2002 (2 months) Lab training in microbiology / Supervisor: **Dr N. GUISO**
Topics: culture and identification of *Bordetella* spp.
Bordetella laboratory, Institute Pasteur, Paris, France
- 2000-01 (3 months) Field work in Niakhar, Senegal / Supervisors: **Dr F. SIMONDON and Dr J.F. GUEGAN**
Topics: range of samples among children with pertussis symptoms and among alive and died animals in Niakhar.
« Epidemiology and Prevention » team, IRD, Dakar, Senegal
- 2000 (6 months) Training internship / Supervisors: **Mr. C. BARNABE and Dr M. TIBAYRENC**
Topics: phylogenetic study of the *Glucose-6-phosphate isomerase* gene in *Trypanosoma cruzi*, Chagas disease agent.
Centre d'Etude sur le Polymorphisme des Micro-organismes, UMR CNRS/IRD, France
- 1999 (2 months) Training period, ERASMUS program
Topics: direct diagnostic of parasitic diseases.
Laboratorio de Parasitología-Microbiología, Hospital Carlos III, Madrid, Spain
- 1997 (2 months) Training internship / Advisors : **Dr O. DOMARLE and Dr P. MILLET**
Topics: *in vitro* culture of *Plasmodium falciparum* and resistance tests to chloroquine and quinine.
International Center of Medical Research of Franceville (CIRMF), Gabon

PUBLICATIONS

Articles

- Chowell G, Cazelles B, **Broutin H**, Munayco CV *In press*. The influence of geographic and climate factors on the timing of dengue epidemics in Perú, 1994-2008. *BMC Infectious Diseases*
- Lavine J, **Broutin H**, Harvill ET & Bjornstad ON (2010) Imperfect vaccine-induced immunity and whooping cough transmission to infants. *Vaccine*. Dec 10;29(1):11-6.
- Broutin H.**, Viboud C., Grenfell B.T., Miller M.A., Rohani P. (2010) Impact of vaccination and birth rate on the epidemiology of pertussis: a comparative study in 64 countries. *Proc Biol Sci*. Nov;277(1698):3239-45
- Philippon S, **Broutin H.**, Constantin de Magny G., Touré , Diakité, Fourquet, Courel M.F., Sultan B., Guégan J.F. (2009) Spatial dynamics of meningitis in Mali: long-term study of persistence and spread. *Int J Infect Dis.*
- Broutin H.**, Miller M.A. (2008) Early vaccination against measles in developing countries. (2008), *BMJ* Jul 24;337:a406. (Commissioned Editorial)
- Yaka P., Sultan B., **Broutin H.**, Janicot S., Philippon S., Fourquet N. (2008) Relationships between climate and year-to-year variability in meningitis outbreaks: a case study in Burkina Faso and Niger. *Int J Health Geogr*. Jul 2;7(1):34.
- Brou T., **Broutin H.**, Elguero E., Asse H., Guégan J.F. (2008) Landscape diversity related to Buruli Ulcer disease in Côte d'Ivoire. *PLoS Negl Trop Dis*. Jul 30;2(7):e271.
- Broutin H.**, Philippon S., Constantin de Magny G., Sultan B., Guégan J.F. (2007) Comparative study of meningitis dynamics across 9 African countries: a global perspective. *International Journal of Health Geographics* 6(1):29-37.
- Brou T.Y., **Broutin H.**, Dosso M., Guégan J.-F. (2006) Impact of habitats modifications on rural population health : Burulin ulcer in Côte d'Ivoire. *Proceedings of the Fifth FRIEND World Conference*, La Havana, Cuba, November, IAHS Publ. **308**: 685-690
- Broutin H.**, Tarrieu F., Tibayrenc M., Oury B. and Barnabé C. (2006) Phylogenetic analysis of the glucose-6-phosphate isomerase gene in *Trypanosoma cruzi*. *Exp Parasitol*. 113(1):1-7.
- Broutin H.**, Mantilla-Beniers N.B., Simondon F., Aaby P., Grenfell B.T., Guégan J.F., Rohani P. (2005) Epidemiological impact of vaccination on the dynamics of two childhood diseases in rural Senegal. *Microbes Infect*. 7(4):593-9.
- Broutin H.**, Guégan J.F., Elguero E., Simondon F., Cazelles B. (2005) Large-scale comparative analysis of pertussis population dynamics: periodicity, synchrony, and impact of vaccination. *Am J Epidemiol*. 161(12):1159-67.
- Broutin H.**, Rohani P., Guégan J. F., Grenfell B. T. and Simondon F. (2004) Loss of immunity to pertussis in a rural community of Senegal. *Vaccine* 22, 595-597.
- Broutin H.**, Simondon F. and Guégan J. F. (2004) Whooping cough metapopulation dynamics in tropical conditions: disease persistence and impact of vaccination. *Proc. R. Soc. London B (Suppl.)* 271, S302-S305.
- Broutin H.**, Elguero E., Simondon F. and Guégan J. F. (2004) Spatial dynamics of pertussis in a small region of Senegal. *Proc R Soc Lond B Biol Sci* 271, 2091-2098.

Contributions to books

- Broutin H.**, Mantilla-Beniers N. and Rohani P. (2007) Ecology of infectious diseases for a better control and prevention: an example with two vaccine preventable infectious disease. In « Encyclopedia

of infectious diseases – Modern methodologies” (Tibayrenc M. Ed.) *Chapter 12*. Wiley and Sons, Chichester, USA.

Guégan J.-F., **Broutin H. (2007)** Microbial communities: Patterns and processes. *In: Biodiversity Change and Human Health: From Ecosystem Services to Spread of Disease* (eds. SALA O., PARMESAN C. and MEYERSON L.A.). Island Press-SCOPE-DIVERSITAS, New York, USA.

Broutin H. (2004). From population dynamics of infectious diseases to their control. *In: Biodiversity and Global Change* (eds. R. Barbault, B. Chevassus-au-Louis), ADPF/MAE editions, Paris, France, pp 129-131. also in French

CONGRESSES AND WORKSHOPS PARTICIPATIONS

Broutin H., Alonso W., Giglio R., Strebel P., Viboud C., Miller M.A. A country and age-specific country model to estimate the global burden of pertussis. *Epidemics 2 conference*, Dec 2009, Athens, Greece. (**poster**)

Agier L.*, **Broutin H.***, Hugonnet S., Bertherat E., Djingarey M., Lingani C., Perea W. Epidemiology of Meningococcal Meningitis in Niger : a district-based comparative study. *Epidemics 2 conference*, Dec 2009, Athens, Greece. (**poster**)

Broutin H., Viboud C., Grenfell B.T., Rohani P., Cummings D. Miller M.A. Pertussis dynamics in the pre- and post-vaccination era in 60 countries: a comparative approach. *Epidemics conference*, December 1-3, 2008, Asilomar, CA.. (**communication**)

Bharti, N.*, **Broutin, H.***, Miller, M., Ferrari, M., Tatem, A., McCabe, C., Grais, R., Djibo, A., Grenfell, B. Impact of Population Density and Movement on Meningitis Dynamics in Niger. *2nd MERIT meeting*, Dec 2008, Ethiopia.

Participation to ‘*International workshop on Pertussis Surveillance Program*’ organized by the Swedish Institute for Infectious Diseases Control, November 18-19, 2008, Stockholm, Sweden.

Broutin H., Alonso W., Giglio R., Viboud C., Miller M.A. A country and age-specific model to estimate the global burden of pertussis. *WHO Quantitative Immunization and Vaccines Related Research (QUIVER) Advisory Committee Meeting*, October 21-22, 2008, Geneva. Switzerland. (**communication**)

Broutin H. Pertussis Dynamics in the Pre- and Post-vaccination Era in 60 Countries: a Comparative Approach. *Bordetella Workshop*. July 22-24, 2008, University of Cambridge, UK. (**Communication**).

Broutin H. Dynamics of Infectious Diseases: pertussis example. Which data for which study? *Workshop for Control and Management of Infectious Diseases*. June 12-14, 2008, CIDD (Center for Infectious Diseases Dynamics), University of Pennsylvania, State College, PA, USA. (**Invited communication**)

Participation to *Microbial Evolution and Co-Adaptation: A Workshop in Honor of Joshua Lederberg*. May 20-21, 2008, Washington, DC, USA..

Broutin H., Viboud C., Grenfell B.T., Miller M.A. Comparative Study of Pertussis Dynamics in the Pre- and Post-Vaccination Era in 60 Countries. *2008 International Conference on Emerging Infectious Diseases (ICEID)*, March 16-19, 2008, Atlanta, GA, USA. (**poster**)

Broutin H., Brou T., Guégan J.F. Déterminants environnementaux de l'émergence de *Mycobacterium ulcerans* : Ecologie, next step ! *9^{èmes} journée de mycobactériologie de langue française*, September 28 -30, 2005, Montpellier, France. (**communication**)

Broutin H., Elguero E., Simondon F., Guégan J.F. Pertussis and measles dynamics in a tropical area: persistence, spread and impact of vaccination. *IX European Multicolloquium Of Parasitology (EMOP)*, July 18-23, 2004, Valencia, Spain (**communication**).

Participation to the 7th *International Meeting on Molecular Epidemiology and Evolutionary Genetics in Infectious Diseases (MEEGID VII)*, July 18-23, 2004, Valencia, Spain.

Broutin H., Simondon F., Guégan J.F. Whooping cough and measles dynamics in a tropical area: a metapopulation approach. *9th meeting of PhD students in Evolutionary Biology*, September 11-16, 2003, Fiesch, Switzerland (**communication**).

Broutin H., Elguero E., Guégan J.F., Simondon F. Comparative analysis of whooping cough dynamics. Do we observe an effect of vaccination? *Pertussis modelling workshop* organised by Aventis Pasteur, October 23-25, 2002, New York City, USA (**Invited communication**).

Participation to *Symposium International "Integrative Biology and Complexity, Stochasticity and Scaling in Natural Systems"* (UNESCO), May 27-29, 2002, Paris, France.

Participation to workgroup "*Macroecology and Evolutionary dynamics of infectious diseases*", group "Whooping cough dynamics", September 2002, Notre Dame de Londres, France.

Broutin H., Guégan J.F., Simondon F. "*Evolutionary epidemiology of Bordetella pertussis in Rural Senegal*", workshop "Host-Parasite Evolutionary Dynamics", September 2001, Montpellier, France (**communication**).

Broutin H., Simondon F., Elguero E., Guégan J.F. *Dynamique spatiale de la coqueluche à Niakhar : diffusion, persistance et tailles de population*. French epidemiology and development network, IRD, September 2004, Montpellier, France (**communication**).

Broutin H., Simondon F., Guégan J.F. *Dynamique spatio-temporelle de la coqueluche et la rougeole en zone tropicale : une approche métapopulationnelle*. French host-pathogen interactions network, November 2003, Nice, France (**communication**).

SEMINARS AND CONSULTATIVE GROUPS

2007 - Member of **MERIT Group** (Meningitis Environmental Risk Information Technologies) created in 2007 (<http://merit.hc-foundation.org>).

1st Meeting, Geneva, Switzerland, September 26-28, 2007.

Broutin H. Long-term epidemiology of Meningococcal Meningitis in the African belt: dynamics and impact of vaccination? (project opportunities session). (**Invited communication**)

2nd Meeting, Adis Abbeba, Ethiopia, December 1-2, 2008. (**2 posters**)

4th Meeting, Adis Abbeba, Ethiopia, December 2-4, 2010.

1st **MAMEMA** workshop organization, Montpellier, France, April 19-21, 2011. **Multi-disciplinary Approach for Meningitis Epidemiology and Modeling in Africa.**

2007 Buruli Ulcer Initiative group, WHO, Geneva.

2007 Seminar at Fogarty International Center, National Institutes of Health, Bethesda, MD, USA. 'Spatio-temporal dynamics of vaccine-preventable infectious diseases: pertussis, measles and meningitis'. March 2007

SCIENTIFIC ANIMATIONS AND TEACHING

Reviewer for *British Medical Journal*, *Proceedings of the Royal Society of London*, serie B, *Emerging Infectious Diseases*, *International Journal of Health Geographics*, *Journal of The Royal Society Interface*.

2004-05 BSc *Ecology: Ecosysteme structure and working (1 hour)*. Title: vaccination and epidemic dynamics. University of Montpellier, France.

2003-04 MSc *in Ecology and Evolutionary Biology (3 hours)*. Spatio-temporal dynamics of pertussis and measles in Niakhar, Senegal. University of Montpellier, France.

2003 Organisation of monthly oral presentations in the GEMI

2001-02 Organisation of 2 workshops "*Macroecology and Evolutionary dynamics of infectious diseases*" and "*Host-Parasite Evolutionary Dynamics*", Montpellier, France.