

Elise Arnaud

35 years old

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Actual situation (since 2006)

Assistant professor in computer science at University Joseph Fourier, Grenoble, France

2010 - : Member of STEEP team of INRIA Rhône-Alpes, and of Laboratory Jean Kuntzmann of Grenoble
Entitled to the PES (a French research and PhD supervision premium)

- **Research area:** development of stochastic tools for a sustainable transition analysis at a urban level
- **Key words:** computational sustainability, environment / land use / economy / transport modeling, uncertainty analysis, sensitivity analysis, parameter calibration, model validation, stochastic optimization

2006 -2009 : Member of PERCEPTION team of INRIA Rhône-Alpes, and of Laboratory Jean Kuntzmann of Grenoble

- **Research area:** development of stochastic approaches for the analysis of image and image sequences
- **Key words :** motion analysis, tracking, stereovision, spatio-temporal analysis, audio-visual analysis, Bayesian models, Markov models, statistical inference

Profile

- **june 2005 - august 2006 :** Post Doctoral position at University of Genova, Italy
- **march-may 2005 :** Post Doctoral position at University of Buenos Aires, Argentina
- **nov. 2004 :** Ph. D. in Signal processing, University of Rennes 1, France - obtained with honours
- **sept. 2001 :** Master degree in Computer vision, University of Rouen, France - obtained with honours
- **juil. 2001 :** Engineering degree from the National Institute of Applied Sciences, department of applied Mathematics, Rouen, France

Student advising

Post-doc and PhD Students

- **Parikshit Dutta,** Post-doc (2011- 2012)

PhD Students

- **Laurent Gilquin** - PhD INRIA (sept 2013 -) - co-supervised with C. Prieur
- **Regis Perrier** - PhD INRIA financed by EADS ASTRIUM (feb 2008 - sept. 2011) - co-supervised with P. Sturm and M. Ortner (EADS Astrium)
- **Ramya Narasihma** - PhD INRIA (sept 2006 - sept 2010) - co-supervised with R. Horaud

Interns

- **Laurent Gilquin** - master student (2013, 6 months) - co-supervised with C. Prieur
- **Martin Crespo** master student (2012, 6 months) - co- supervised avec E. Prados
- **Hugo Luis Manterola,** master student (2011, 6 months) - co- supervised avec E. Prados
- **Mariano Fernandez** - master student (2011, 6 months) - co- supervised avec E. Prados
- **Anthony Tschirhard** - Bachelor student (2011, 3 months) - co-supervised with E. Prados
- **Emmanuel Iarusso** - master student (2010, 6 months) - co-supervised with E. Prados
- **Enzo Ferrante** - master student (2010, 6 months) - co-supervised with E.
- **Claude Mergen** - DRT financed by Enerdata (2010, 1 year) - co-supervised with E. Prados and A. Kitous (Enerdata)
- **Chao Wang** - Bachelor student (2010, 4 months) - co-supervised with E. Prados

- **Marie Chevallier** - License student (2010, 2 months) - co-supervised with E. Prados
- **Rodrigo Andrade de Bem** - master student (2007, 6 months) - co-supervised with E. Boyer

Contracts, projects, national and European actions

- **CITiES** [Calibrage et validation de modèles Transport - usagE des Sols]
ANR program "Numerical models", 2012
Budget: 980 000 Euro.
Partners: INRIA (STEEP/MOISE), IRTESeT, IFSTTAR-DEST, LET, IDDRI, LVMT, Vinci, IAU ile-de- France.
- **TRACER** [TRanus, Analyse de la Calibration et des Erreurs, Retours sur Grenoble et Caracas]
ECOS-NORD Program (2011-2014).
Partners: IDDRI, Modelistica, INRIA
- **SOCLE3** [Soutenabilite, Organisation Collective Locale, Environnement, Economie, Energie: Vers des espaces urbains et peri-urbains durables]
PIRVE program 2009
Budget: 20 000 euros
Partners: LEPII, LGGE, OSUG, PACTE, INRIA (all in France).
- **POP** [Perception On Purpose]
European project, 2006-2008
<http://perception.inrialpes.fr/POP/>
Budget : 300 000 euros
Partners: University of Osnabruck (Germany), University Hospital Hamburg-Eppendorf (Germany), University of Coimbra (Portugal), and University of Sheffield (UK), INRIA (France)
- **Fantastik** [Filtering for statistical animation]
INRIA ARC program, 2007-2008
<http://perception.inrialpes.fr/~Arnaud/wwwFantastik/>
Budget : 30 000 euros
Partners: INRIA Rhône-Alpes, University de Bretagne Sud, ENS Cachan (all in France).

Teaching

2006 - : Assistant professor, University Joseph Fourier, France

- Initiation to applied math, BSc first year (2008- 2012)
 - Programming and multimedia, BSc first year (2006-2009)
 - Mathematics for engineer, BSc first year (2013-)
 - Statistics for biologists, BSc second year, (2007-)
 - Mathematical tools, MSc first year (2007-2009)
 - Computer Vision and Robotics, MSc first year (2008 - 2009)
 - Image and Signal Processing, MSc first year (2008)
 - Advising students on apprenticeship, MSc second year (2008-)
 - Image processing and indexing, MSc second year (2006-2008)
 - Computer vision, MSc second year (2010-)
 - Multimedia documents : description and indexing, MSc second year (2009-2012)
 - Bayesian networks and inference, MSc second year (2007-)
 - Bayesian filtering, MSc second year (2008-2009)
 - Member of numerous committees for MSc and BSc projects.
- **2012 : Pedagogic project** Problem based learning for Mathematics for engineer, BSc first year

2001 - 2004: PhD student, University de Rennes 1, Monitorat

- Computational treatment of biologic data - BSc First and second years
- Computer Science (1st and 2nd part, multidisciplinary project) - BSc First and second years
- Programming - BSc First and second years
- Computer Vision - Engineering degree in Computer Sciences and Communication (MSc), 3rd year
- Project training - Engineering degree in Computer Sciences and Communication (MSc), 3rd year

Participation to the scientific community

Events organisation

- Training course and workshop on TRANUS, one week. July 2013
- Sustainable development day at INRIA, March 22th 2010.
- ECCV 2008, involved in local organisation

Reviewer for international conferences and journals

- Eurasip Signal Processing
- Image and Vision Computing Journal
- Machine Vision and Applications Journal
- International Journal of Computer Vision
- Conference on Computer Vision and Pattern Recognition

Participation to juries and committees

- 2012 - 2013 Member of recruitment committee of associate professorship at Université Joseph Fourier, Grenoble,
- 2010 : Member of the PhD committee of Nicolas Widynski, Télécom ParisTech
- 2007 - 2013 : Member of CORDIs (Contrat de Recherche Doctoral INRIA) PhD recruitment committee,
- 2003 - 2004 : Elected PhD representative at IRISA

Publications

The majority of my publications are available on my Web page or on HAL [<http://hal.archives-ouvertes.fr/>].

Publications in computational sustainability

International Journal

- P. Dutta, E. Arnaud, E. Prados, M. Saujot, *Calibration of an Integrated Land Use and Transportation Model Using Maximum Likelihood Estimation*, IEEE Transactions on Computers, 63(1), 2014

Book Chapter

- P.-Y. Longaretti, J. Alapetite, J.-Y. Courtonne, E. Arnaud, E. Prados, D. Dupré, A. Rolland, P. Sturm, *Durabilité et modélisation intégrée de la ville et de son territoire : quels outils pour quels objectifs ?* Submitted for a book chapter in *Écologies urbaines 2*

Refereed International Conference

- E. Arnaud, P.-Y. Longaretti, E. Prados, and P. Sturm. *Modelling for local scale sustainability and decision-making support: reflections and difficulties* in Gérard Hégron. *Flow modeling for urban planning*, Jun 2012, Lille, France. IFSTTAR, Actes du colloque du GIS Modélisation Urbaine - La modélisation des flux au service de l'aménagement urbain - Flow modeling for urban development, pp. 41-51, 2013
- P. Dutta, E. Arnaud, E. Prados, B. Lefèvre and M. Saujot. *Sensitivity Analysis of a Large Scale Integrated Land Use and Transportation System*. CompSust'12, 3rd International Conference on Computational Sustainability, Copenhagen, Denmark, July 5-6, 2012.
- J.-Y. Courtonne, J. Alapetite, P.-Y. Longaretti, D. Dupré, E. Arnaud and E. Prados *Study of cereals flows at local scales: Examples in the Rhône-Alpes région, the Isère département and the SCOT de Grenoble*. CompSust'12, 3rd International Conference on Computational Sustainability, Copenhagen, Denmark, July 5-6, 2012.
- P. Dutta, M. Saujot, E. Arnaud, B. Lefèvre and E. Prados - *Uncertainty Propagation and Sensitivity Analysis During Calibration of TRANUS, an Integrated Land Use and Transport Model*. ICURPT 2012 : International Conference on Urban, Regional Planning and Transportation, Amsterdam, Netherlands, May 2012.

Popularization

- E. Prados, E. Arnaud - *Quel développement durable ?* - La recherche, October 2010, number 445
- E. Prados, E. Arnaud - *Des outils d'informatique d'aide à la décision en faveur du développement durable* - Actu-Environnement http://www.actu-environnement.com/v_nws.php4?id=11117

Invited talks

- E. Arnaud and P. Sturm. *Modèles LUTI - des modèles numériques*. 2me Journée d'études sur les modèles "Occupation du sol - Transport", Centre d'Analyse Stratégique, Paris, France, dec 2012
- E. Prados, P.-Y. Longaretti, E. Arnaud, Patrick Criqui, D. Dupré, B. Lefevre, M. Saujot, P. Sturm, J.-Y. Courtonne, J. Alapetite *Integrated Urban Modelling for Sustainable Policies: Considerations and Difficulties* Flow modeling for urban development, Lille, France. Jun 2012
- E. Prados, E. Arnaud, P.-Y. Longaretti and F. Mancebo - *Mathematical and numerical analyses of local integrated models*. Workshop on Decision Analysis and Sustainable Development, Montreal, Canada, September 27-28, 2010.

Publications in computer vision, image processing and related

International Journals

- R. Perrier, E. Arnaud, P. Sturm, M. Ortner - *Estimation of an observation satellite's attitude using multimodal pushbroom cameras* - accepted for publication in PAMI, 2014
- R. Sosa, E. Arnaud, E. Mémin, G. Artana *Study of flow induces by a sliding discharge* - IEEE Trans. On Dielectrics and Electrical Insulation, 16(2), 2009
- M. Tournier, X. Wu, N. Courty, E. Arnaud, L. Reveret - *Motion compression using principal geodesics analysis* - Eurographics, avril 2009 - ([Award: best third paper in eurographics conference](#))
- E. Arnaud, E. Mémin - *Partial Linear Gaussian Models for Tracking in Image Sequences Using Sequential Monte Carlo Methods* - Int. Jour. of Computer Vision, 74(1), 2007
- E. Arnaud, E. Mémin, B. Cernuschi-Frias - *Conditional filters for image sequence based tracking - Application to point tracking* - IEEE Trans. on Image Processing, 14(1), 2005.

Peer-Reviewed Internatinal Conferences

- R. Perrier, E. Arnaud, P. Sturm, M. Ortner - *Sensor measurements and image registration fusion to retrieve variations of satellite attitude* - Asian Conf. on Computer Vision (ACCV), nov. 2010
- R. Perrier, E. Arnaud, P. Sturm, M. Ortner - *Satellite Image Registration for Attitude Estimation with a Constrained Polynomial Model*- Int. Conf. on Image Processing (ICIP), Sept. 2010.
- R. Narasimha, E. Arnaud, F. Forbes, R. Horaud - *Disparity and normal estimation through alternating maximization*- Int. Conf. on Image Processing (ICIP), Sept. 2010.
- R. Perrier, E. Arnaud, P. Sturm, M. Ortner - *Image-based satellite attitude estimation* - IEEE International Geoscience and Remote Sensing Symposium (IGARSS), july 2010
- R. Perrier, E. Arnaud, P. Sturm, M. Ortner - *Estimating satellite attitude from pushbroom sensors* - IEEE Conference on Computer Vision and Pattern Recognition (CVPR), june 2009
- E. Arnaud, F. Le Gland - *SMC with adaptive resampling: large sample asymptotics* - IEEE workshop on Statistical Signal Processing, sept 2009
- V. Khalidov, F. Forbes, M. Hansard, E. Arnaud, R. Horaud - *Detection and localization of 3D audio-visual objects using unsupervised clustering* - ACM/IEEE International Conference on Multimodal Interfaces (ICMI), oct. 2008
- E. Arnaud, H. Christensen, Y.-C. Lu, J. Barker, V. Khalidov, M. Hansard, B. Holveck, H. Mathieu, R. Narasimha, E. Taillant, F. Forbes, R. Horaud, *The CAVA corpus: synchronised stereoscopic and binaural datasets with head movements*, ACM/IEEE International Conference on Multimodal Interfaces (ICMI) - Oct. 2008
- R. Narasimha, E. Arnaud, F. Forbes, R. Horaud - *Cooperative disparity and object boundary estimation* - Int. Conf. on Image Processing (ICIP) , Oct. 2008.
- V. Khalidov, F. Forbes, M. Hansard, E. Arnaud, R. Horaud - *Audio-Visual Clustering for Multiple Speaker Localization* - International Workshop on Machine Learning for Multimodal Interaction (MLMI) - Sept. 2008
- N. Courty, E. Arnaud - *Inverse Kinematics using Sequential Monte Carlo Methods* - Conf. on Articulated Motion and Deformable Object (AMDO), july 2008. [Award: best paper.](#)
- A. Fossati, E. Arnaud, R. Horaud, P. Fua - *Tracking Articulated Bodies using Generalized Expectation Maximization* - NORDIA (workshop CVPR), june 2008.
- R. Sosa, E. Arnaud, E. Mémin, G. Artana - *Schlieren Image Velocimetry applied to EHD flow* - Internationa Symposium on Electrohydrodynamics, Dec. 2006.
- R. Sosa, E. Arnaud, G. Artana - *Study of the flow induced by a sliding discharge* - International Symposium on Electrohydrodynamics, Dec. 2006.
- P. Paul, A. Quere, E. Arnaud, X. Morandi, P. Jannin - *A surface registration approach for video-based analysis of intraoperative brain surface deformations* - Workshop on Augmented Environments for Medical Imaging and Computer-Aided Surgery, Oct. 2006.

- E. Delponte, E. Arnaud, F. Odone, A. Verri - *Analysis on a local approach to 3D object recognition* - DAGM, Sept. 2006.
- E. Arnaud, E. Delponte, F. Odone, A. Verri - *Trains of keypoints for 3D object recognition*- Int. Conf. on Pattern Recognition (ICIP), Aug. 2006.
- E. Arnaud, E. Mémin, R. Sosa, G. Artana - *A fluid motion estimator for Schlieren image velocimetry* - Eur. Conf Computer Vision (ECCV), may 2006
- E. Arnaud, E. Mémin - *An efficient Rao-Blackwellized particle filter for object tracking* - IEEE Int. Conf. on Image Processing (ICIP), sept. 2005.
- E. Arnaud, B. Fauvet, E. Mémin, P. Bouthemy - *A robust and automatic face tracker dedicated to broadcast videos* - - IEEE Int. Conf. on Image Processing (ICIP), sept. 2005.
- E. Arnaud, E. Mémin - *Optimal importance sampling for tracking in image sequence: application to point tracking* - IEEE European Conf. on Computer Vision (ICCV), may 2004.
- E. Arnaud, E. Mémin, B. Cernuschi-Frias - *A robust stochastic filter for point tracking in image sequences* - IEEE Asian Conf. on Computer Vision (ACCV), jan. 2004.

Peer-Reviewed National Conferences

- R. Perrier, E. Arnaud, P. Sturm, M. Ortner - *Estimation de l'attitude d'un satellite par recalage d'images* - CORESA, oct. 2010
- E. Arnaud, E. Mémin, B. Cernuschi-Frias - *Filtrage conditionnel pour la trajectographie dans des séquences d'images - Application au suivi de points* - RFIA, jan. 2004.
- E. Arnaud, E. Mémin, B. Cernuschi-Frias - *Filtrage conditionnel pour le suivi de points dans des séquences d'images* - ORASIS, may 2003.

Research Reports

- R. Narasimha, E. Arnaud, F. Forbes, R. Horaud - *A Joint Framework for Disparity and Surface Normal Estimation*- rapport de recherche INRIA 7090, 2009
- M. Tournier, X. Wu, N. Courty, E. Arnaud, L. Reveret - *Motion Compression using Principal Geodesics Analysis* - research report INRIA 6648, sept. 2008
- N. Courty, E. Arnaud - *Sequential Monte Carlo Inverse Kinematics* - research report INRIA 6426, dec. 2007.

Dissertation

- E. Arnaud - *Méthodes de filtrage pour du suivi dans des séquences d'images -Application au suivi de points caractéristiques* - PhD Thesis, Universtiy of Rennes 1, France, nov. 2004

Other scientific production

- **Patent.** R. Perrier, M. Ortner, E. Arnaud, P. Sturm. Method for estimating the movement of a traveling observation instrument flying over a celestial body. International patent WO/2011/061123, 2011.
- **Patent.** R. Perrier, M. Ortner, E. Arnaud, P. Sturm. Procédé d'estimation du mouvement d'un instrument d'observation à défilement survolant un corps céleste. French Patent FR2952744 A1, 2011.
- **DataBase CAVA** (Computational Audio-Visual Analysis) - 2008
http://perception.inrialpes.fr/CAVA_Dataset/Site/E.Arnaud,H.Christensen,Y.-C.Lu,J.Barker,V.Khalidov,M.Hansard,B.Holveck,H.Mathieu,R.Narasimha,E.Taillant,F.Forbes,R.Horaud -- *The CAVA corpus: synchronised stereoscopic and binaural datasets with head movements* -- ACM/IEEE International Conference on Multimodal Interfaces (ICMI'08) - Octobre 2008