Elise Arnaud

36 years old
https://team.inria.fr/airsea/en/english-elise-arnaud/
elise.arnaud@imag.fr

Université Joseph Fourier
Laboratoire Jean Kuntzmann
51 rue des mathématiques, BP 53
38041 Grenoble Cedex, France

tel : +33 (0)4 76 51 42 56

Assistant professor at University Joseph Fourier,Grenoble, France

Sept 2015 – : Member of AIRSEA team of INRIA Rhône-Alpes, and of Laboratory Jean Kuntzmann of Grenoble

2010 – 2015 : Member of STEEP team of INRIA Rhône-Alpes, and of Laboratory Jean Kuntzmann of Grenoble

- **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

Since 2009 : Entitled to the PES (a French research and PhD supervision premium)

Profile

- **june 2005 - august 2006** : Post Doctoral postition 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

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Student advising

Post-doc

- **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

- **CITiES** [Calibrage et valIdation de modèles Transport - usagE des Sols]
  ANR program "Numerical models", 2012
  Budget: 980 000 Euro.
  Partners: INRIA (STEEP/MOISE), IRTES-SeT, 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 seconf 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.

- **2015 : Pedagotice project** Problem based learning for Mathematics for engineer – part 2, BSc first year
- **2015 : Promision project** Use of videos in problem based learning for Mathematics for engineer, BSc first year
- **2012 : Pedagotice project** Problem based learning for Mathematics for engineer – part 1, 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 conférences 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 jurys and committees

- 2012,13,15 Member of recruitment commitee 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 représentative at IRISA

Publications

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

International Journal

- L. Gilquin, C. Prieur, E. Arnaud, *Replication procedure for grouped Sobol' indices estimation in dependent uncertainty spaces*, Information and Inference 2015

- 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

- 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.

Refereed International Conference

- M. Saujot, M. De Lapparent, E. Arnaud, E. Prados, *To make LUTI models operationnal tools for planning.* International Conference on Computers in Urban Planning and Urban Management (CUPUM), Jun 2015, Cambridge, United States. 2015

- 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.

- 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 Mode*l– 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 satelitte 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. <u>Award: best paper.</u>

- 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 deformation*s – 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 broadcoast 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 (ICIP), 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.

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.

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.

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 decision en faveur du développement durable* – Actu-Environnement http://www.actu-environnement.com/v_nws.php4?id=11117

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