

Kurt H. Plarre

278 Ellwood Beach Dr. Apt. 19
Goleta, CA 93117 / 805 456-9363

plarre@engineering.ucsb.edu
<http://www.engineering.ucsb.edu/~plarre>

Education	University of Illinois at Urbana-Champaign PhD Electrical Engineering <ul style="list-style-type: none">• Thesis advisor: Professor P. R. Kumar• Thesis title: <i>Problems in Sensor Networks: Inference, localization, and motion estimation</i>	May, 2006
	University of Illinois at Urbana-Champaign MS Mathematics	May, 2005
	University of Illinois at Urbana-Champaign MS Electrical Engineering <ul style="list-style-type: none">• Thesis advisor: Professor P. R. Kumar• Thesis title: <i>Methodology for the adaptation of affine switched models with application to vehicle speed forecasting</i>	May, 2001
	Universidad Técnica Federico Santa María, Chile Electronics Engineer, specialized in Automatic Control (6 year program) <ul style="list-style-type: none">• Thesis advisor: Professor R. Rojas• Thesis title: <i>Contributions to Generalized Predictive Control (Spanish)</i>• “Best Graduating Student, Electronics Engineering” award	Dec., 1996

Research Experience	University of California, Santa Barbara Mechanical Engineering Department Postdoctoral Research Associate <ul style="list-style-type: none">• Kalman Filtering with random observation arrivals: <i>I am working on understanding the Kalman filter with intermittent observations, i.e., when observations are available randomly. The focus is on finding conditions for stability of the expected covariance in terms of the system parameters and the observation arrival process. Using a novel decomposition of positive semidefinite matrices, I was able to characterize the stability region for a class of systems. See [1].</i>• Decentralized filtering: <i>I am also working on simple filtering algorithms for decentralized systems such as Sensor Networks and Robot Teams, using ideas from Graphical Models.</i>	May, 2006–present
	University of Illinois at Urbana-Champaign Electrical Engineering Department Graduate Research Assistant <ul style="list-style-type: none">• Graphical Models: <i>I worked on Graphical Models with Gaussian variables. I proved that the Message Passing algorithm in trees is equivalent to a decentralized implementation of Gaussian Elimination, and used this result to obtain an inference algorithm for a class of Gaussian models, that is amenable to decentralized implementation. See [5].</i>• Object tracking with Sensor Networks: <i>We studied the problem of using a network of highly directional sensors (e.g., lasers) to estimate the trajectory of objects moving in straight lines and at constant speed. The data available to the estimation algorithm were only the times at which the objects interrupted the lasers. The estimation included the minimization of a non-convex cost function. I simulated the algorithm and implemented it using Berkeley motes. I designed the setup, performed the experiments, and reported the results. I collaborated with a person who programmed the motes. See [2].</i>• Organization of decentralized estimation algorithm: <i>We studied the problem of localizing a heat source using a network of temperature sensors. The solution to the estimation problem involved the minimization of a non-convex cost function, which had to be performed cooperatively by the sensors. To organize the computations in the network we used ideas from Graphical Models. See [4].</i>	1998–2006
	Universidad Técnica Federico Santa María, Chile Electronics Engineering Department Research Assistant (various assistantships during this period) <ul style="list-style-type: none">• Generalized Predictive Control: <i>I studied the Generalized Predictive Control (GPC) method. GPC is a moving horizon control design method which computes optimal inputs by predicting their effect on the outputs. I found a closed form solution to the polynomial Diophantine equation involved and used it to analyze the behavior of the method. See [7].</i>	1992–1996

Research Experience Contd.	<ul style="list-style-type: none"> • Failure detection system: I designed and built a prototype of a small, low cost, low power device to detect the thinning of the inner rubber layer of some pipes used in mining. I successfully tested such device on a steel plate. 	
Teaching Experience	Universidad Técnica Federico Santa María, Chile Lecturer <ul style="list-style-type: none"> • Taught an Automatic Control Laboratory course • Organized laboratory sessions, helped students during sessions • Gave lectures explaining the experiments • Supervised two teaching assistants • Responsible for the laboratory equipment 	1997–1998
	Universidad Técnica Federico Santa María Teaching Assistant (various assistantships during this period) <ul style="list-style-type: none"> • Assistant for courses such as: <ul style="list-style-type: none"> - Linear Systems Analysis, - Industrial Control Laboratory, - Automatic Control Laboratory, - Linear Algebra and Ordinary Differential Equations, - Matlab • Gave lectures solving and explaining practice problems • Graded exams 	1992–1996
Industry Experience	South American Steamship Company, Chile Intern <ul style="list-style-type: none"> • Worked with electrician on cargo ship • Maintained and repaired on-board electrical equipment 	1995
	Rural Electrical Cooperative, Chile Intern <ul style="list-style-type: none"> • Worked as part of a maintenance team • Installed and repaired electrical equipment in rural areas 	1993

Publications

- [1] K. Plarre and F. Bullo. On Kalman Filtering for detectable systems with intermittent observations. *Submitted to IEEE Transactions on Automatic Control*.
- [2] K. Plarre and P. R. Kumar. Tracking objects with networked scattered directional sensors. *EURASIP Journal on Advances in Signal Processing: Special Issue on Cooperative Localization in Wireless Ad Hoc and Sensor Networks*, vol. 2008, Article ID 360912, 10 pages, 2008. doi:10.1155/2008/360912.
- [3] K. Plarre and P. R. Kumar. Object tracking by scattered directional sensors. In *Proceedings of the 44th IEEE Conference on Decision and Control (CDC2005)*, pp. 3123–3128, 2005 (invited paper).
- [4] K. Plarre, P. R. Kumar, and T. Seidman. Increasingly correct Message Passing Algorithms for heat source detection in Sensor Networks. In *Proceedings of the first IEEE International Conference on Sensor and Ad Hoc Networks (SECON 2004)*, pp. 470–479, 2004.
- [5] K. Plarre and P. R. Kumar. Extended Message Passing algorithm for inference in loopy Gaussian Graphical Models. *Ad Hoc Networks*, vol. 2, no. 2, pp. 153–169, 2004.
- [6] K. Plarre and P. R. Kumar. Gaussian inference in loopy Graphical Models. In *Proceedings of the 42nd IEEE Conference on Decision and Control (CDC 2003)*, pp. 5747–5752, 2003.
- [7] K. Plarre, A. Rojas, and R. Rojas. Analytical solution to the Polynomial Diophantine Equation: Development and application to Generalized Predictive Control analysis. *IEE Conference Publication*, no. 455, 1, pp. 804–809, 1998.
- [8] K. Plarre, A. Rojas, and R. Rojas. Estudio y determinación de la robustez de algoritmos de Control Predictivo. *14^o Congreso Argentino de Control Automático (AADECA'98)*, Buenos Aires, Argentina, vol. 1, pp. 579–584, 1998.
- [9] A. Rojas, K. Plarre, and R. Rojas. Desempeño del Control Predictivo Generalizado en plantas con retardo. *14^o Congreso Argentino de Control Automático (AADECA'98)*, Buenos Aires, Argentina, vol. 1, pp. 573–578, 1998.

Courses and Training

One semester courses, University of Illinois at Urbana-Champaign

- Control Systems Theory and Design (1998), Analysis of Nonlinear Systems (2001),
- Control of Stochastic Systems (1999), Optimal Control Systems (2001),
- Nonlinear and Adaptive Control (2000), Advanced Nonlinear Dynamics (2003),
- Random Processes (1998), Theory of Probability (1999),
- Real Analysis (1999), Combinatorial Mathematics (2003),
- Communications (1999), Wireless Ad Hoc Networks (2003),
- Graph Theory and its Applications (2000), Introduction to Abstract Algebra (2004)
- Digital Signal Processing (1999), System Identification (2002),
- Introduction to Optimization (2000), Parallel Numerical Algorithms (2004)
- Automata, Formal Languages, and Computational Complexity (2002)

Other courses and training

- Entrepreneur Training Program (Santa Barbara Community College, 2006)
- First Smart Dust Training Seminar (Crossbow Inc., San Francisco, CA, 2003)
- Partial Differential Equations (Universidad Técnica Federico Santa María, Chile, 1996)
- Basic Unix (Universidad Técnica Federico Santa María, Chile, 1996)
- Basic Quantum Physics (Universidad Técnica Federico Santa María, Chile, 1994)
- Classical Mechanics (Universidad Técnica Federico Santa María, Chile, 1994)
- Fortran and IMSL (short course, Universidad Técnica Federico Santa María, Chile, 1992)

Additional Information

Languages

- **Spanish** : Mother tongue
- **English** : Advanced oral and written communication
- **German** : Intermediate oral and written communication

Software and programming experience

- **Languages** : C, Fortran, Visual Basic (have used), Java, Javascript (learning by myself)
- **Software** : Matlab, Latex, Office (use daily), Simulink, PSPICE, Autocad (have used)
- **Systems** : Unix, Linux, Windows (user)

Memberships

- Life member, University of Illinois Alumni Association

Service

- Student volunteer 42nd IEEE Conference on Decision and Control (CDC2003)
- Reviewer for professional journals and conferences such as:
 - Automatica,
 - IEEE Transactions on Automatic Control,
 - IEEE Transactions on Signal Processing,
 - Control and Decision Conference (CDC)

Citizenship

- Chilean
- German