

# Michel Charpentier

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## EDUCATION:

- Sept 94–Nov 97 **Ph.D. (Doctorate) in computer science** from *Institut National Polytechnique (INPT)*, Toulouse, France.  
Area: distributed systems, formal methods, automated theorem proving.  
Thesis: *Assistance à la Répartition de Systèmes Réactifs* (“Support for the Distribution of Reactive Systems”).  
Advisor: Pr. Gérard Padiou.  
*Mention très honorable avec félicitations.*
- Sept 92–Sept 93 **M.S. (D.E.A.) in computer science** (foundations and parallelism) from *INPT*.  
Area: distributed systems, formal methods, automated theorem proving.  
Thesis: *Assistance au Raffinement de Programmes Répartis* (“Support for the Refinement of Distributed Programs”).  
Design and implementation of the assistant tool DADA.  
Advisor: Pr. Gérard Padiou.
- Oct 90–June 93 **B.S. (Degree in Engineering) in computer science and applied mathematics** from *INPT*.
- Sept 87–June 90 *Mathématiques Supérieures et Mathématiques Spéciales* (Post-secondary programs leading to the nationwide competitive examinations to “*Grandes Écoles*”), Lille, France.

## PROFESSIONAL EXPERIENCE:

- Jun 06–Present **Associate professor**, department of computer science, University of New Hampshire, Durham, NH.  
Area: formal methods and distributed systems.  
Unified frameworks for reactive distributed systems, mobile agents, control systems, sensor networks, etc.  
Teaching in logic, formal methods and programming languages.
- Sep 06–Jun 07 **Visiting (associate) professor**, department of computer science, California Institute of Technology, Pasadena, CA.  
Area: distributed systems, unifying theories.
- Jul 04 **Visiting (full) professor**, *Institut National Polytechnique (INPT)*, Toulouse, France (ACADIE group).  
Area: agent-based distributed systems.

- Nov 99–Jun 06 **Assistant professor**, department of computer science, University of New Hampshire, Durham, NH.  
 Area: formal methods and distributed systems.  
 Component-based formal specifications and correctness proofs of reactive systems, mobile agents for dynamic distributed systems.  
 Teaching in logic, formal methods and programming languages.
- Sept 98–Oct 99 **Postdoctoral scholar**, department of computer science, California Institute of Technology, Pasadena, CA.  
 Area: distributed systems, formal methods.  
 Component-based formal specifications and correctness proofs of distributed systems.
- Sept 97–Aug 98 **Research and teaching fellow (ATER)** at *INPT*.  
 Communication refinement for formal specifications and correctness proofs of distributed systems.  
 Teaching in operating systems, distributed algorithms, object-oriented design and programming, assembly language, algorithms, functional and imperative programming.
- Sept 94–Aug 97 **Teaching fellow (Moniteur)** at *INPT*.  
 Teaching in operating systems, distributed algorithms, algorithms, imperative programming.

#### ACADEMIC AWARDS AND HONOURS:

- 2001 **Summer Faculty Fellowship** from the Graduate School, “*Experimentation with Automatic Theorem Provers*”.
- 2000 **Faculty Development grant**, “*Formal Methods for Parallel Programming*”.
- 1998 **Prix Léopold Escande** for the doctoral thesis, from *INPT*. This prize distinguished 19 theses from a total number of 141.
- 1994–97 **Research ministry fellowship (Allocataire de recherche MESR)**.

#### PUBLICATIONS:

##### Journals.

- [1] M. Charpentier. Composing invariants. *Science of Computer Programming*, 2005. Accepted for publication.
- [2] M. Charpentier and K. M. Chandy. Specification transformers: A predicate transformer approach to composition. *Acta Informatica*, 40(3):265–301, Feb. 2004.
- [3] K. M. Chandy and M. Charpentier. An experiment in program composition and proof. *Formal Methods in System Design*, 20(1):7–21, Jan. 2002.
- [4] Michel Charpentier, Mamoun Filali, Philippe Mauran, Gérard Padiou, and Philippe Quéinnec. The observation: an abstract communication mechanism. *Parallel Processing Letters*, 9(3), July 1999.
- [5] Michel Charpentier and Gérard Padiou. Specification and verification of the ATMR protocol using UNITY. Part 1: modeling and specification. *Parallel Processing Letters*, 8(4):421–432, December 1998.

- [6] Michel Charpentier and Gérard Padiou. Specification and verification of the ATMR protocol using UNITY. Part 2: correctness proof. *Parallel Processing Letters*, 8(4):433–445, December 1998.
- [7] Michel Charpentier, Abdellah El Hadri, and Gérard Padiou. Preuve automatique dans un environnement de développement UNITY. *Technique et Science Informatiques (TSI)*, 15(1):37–63, January 1996.
- Conferences.**
- [8] M. Charpentier, R. Bartoš, and S. Bhatia. When opportunity proceeds from autonomy: A tour-based architecture for disconnected mobile sensors. In *Third IEEE WoWMoM Workshop on Autonomic and Opportunistic Communications (AOC'2009)*, Kos, Greece, June 2009.
- [9] M. Charpentier, R. Bartoš, and S. Bhatia. A mechanism to structure mission-aware interaction in mobile sensor networks. In V. Garg, R. Wattenhofer, and K. Kothapalli, editors, *10th International Conference on Distributed Computing and Networking (ICDCN'2009)*, volume 5408 of *Lecture Notes in Computer Science*, pages 425–436. Springer-Verlag, 2009.
- [10] K. M. Chandy, M. Charpentier, and A. Capponi. Towards a theory of events. In H.-A. Jacobsen, G. Mühl, and M. A. Jaeger, editors, *Inaugural International Conference on Distributed Event-Based Systems (DEBS'2007)*, pages 180–187. ACM Press, June 2007.
- [11] K. M. Chandy and M. Charpentier. Self-similar algorithms for dynamic distributed systems. In *27th International Conference on Distributed Computing Systems (ICDCS'2007)*, June 2007.
- [12] M. Charpentier, G. Padiou, and P. Quéinnec. Cooperative mobile agents to gather global information. In *4th International Symposium on Network Computing and Applications (NCA'2005)*. IEEE Computer Society, July 2005.
- [13] M. Charpentier. Composing invariants. In K. Araki, S. Gnesi, and D. Mandrioli, editors, *12th International Symposium of Formal Methods Europe (FME'2003)*, volume 2805 of *Lecture Notes in Computer Science*, pages 401–421. Springer-Verlag, Sept. 2003.
- [14] M. Charpentier. An approach to composition motivated by wp. In R. Kutsche and H. Weber, editors, *Fundamental Approaches to Software Engineering (FASE'2002)*, volume 2306 of *Lecture Notes in Computer Science*, pages 1–14. Springer-Verlag, Apr. 2002.
- [15] M. Charpentier. Reasoning about composition: A predicate transformer approach. In *Specification and Verification of Component-Based Systems (SAVCBS'2001)*, pages 42–49. Workshop at OOPSLA'2001, Oct. 2001.
- [16] M. Charpentier and K. M. Chandy. Reasoning about composition using property transformers and their conjugates. In J. van Leeuwen, O. Watanabe, M. Hagiya, P. Mosses, and T. Ito, editors, *Theoretical Computer Science: Exploring New Frontiers of Theoretical Informatics (IFIP-TCS'2000)*, volume 1872 of *Lecture Notes in Computer Science*, pages 580–595. Springer-Verlag, Aug. 2000.
- [17] M. Charpentier and K. M. Chandy. Theorems about composition. In R. Backhouse and J. N. Oliveira, editors, *International Conference on Mathematics of Program Construction (MPC'2000)*, volume 1837 of *Lecture Notes in Computer Science*, pages 167–186. Springer-Verlag, July 2000.
- [18] K. M. Chandy and M. Charpentier. Predicate transformers for composition. In J. Davies, B. Roscoe, and J. Woodcock, editors, *Millennial Perspectives in Computer Science: proceedings of the 1999 Oxford-Microsoft symposium in honour of Sir Tony Hoare*, Cornerstones of Computing, pages 81–90. Palgrave, 2000.
- [19] Michel Charpentier, Mamoun Filali, Philippe Mauran, Gérard Padiou, and Philippe Quéinnec. Modelling and verifying mobility : A case study. In *In-*

- ternational Conference On Principles Of DIstributed Systems (OPODIS'99)*, pages 151–166, Hanoi, Vietnam, October 1999.
- [20] Michel Charpentier and K. Mani Chandy. Towards a compositional approach to the design and verification of distributed systems. In J. Wing, J. Woodcock, and J. Davies, editors, *World Congress on Formal Methods in the Development of Computing Systems (FM'99)*, (Vol. I), volume 1708 of *Lecture Notes in Computer Science*, pages 570–589. Springer-Verlag, September 1999.
  - [21] Michel Charpentier and K. Mani Chandy. Examples of program composition illustrating the use of universal properties. In J. Rolim, editor, *International workshop on Formal Methods for Parallel Programming: Theory and Applications (FMPPTA '99)*, volume 1586 of *Lecture Notes in Computer Science*, pages 1215–1227. Springer-Verlag, April 1999.
  - [22] Michel Charpentier, Mamoun Filali, Philippe Mauran, Gérard Padiou, and Philippe Quéinnec. Tailoring UNITY to distributed program design. In J. Rolim, editor, *International workshop on Formal Methods for Parallel Programming: Theory and Applications (FMPPTA '98)*, volume 1388 of *Lecture Notes in Computer Science*, pages 820–832. Springer-Verlag, April 1998.
  - [23] Michel Charpentier. A UNITY mapping operator for distributed programs. In J. Fitzgerald, C.B. Jones, and P. Lucas, editors, *International Symposium of Formal Methods Europe (FME'97)*, volume 1313 of *Lecture Notes in Computer Science*, pages 665–684. Springer-Verlag, September 1997.
  - [24] Michel Charpentier and Gérard Padiou. Specification and verification of the ATMR protocol using UNITY. In D. Méry, editor, *International workshop on Formal Methods for Parallel Programming: Theory and Applications (FMPPTA '97)*, pages 26–36, April 1997.
  - [25] Michel Charpentier, Mamoun Filali, Philippe Mauran, Gérard Padiou, and Philippe Quéinnec. Abstracting communication to reason about distributed algorithms. In Ö. Babaoğlu and K. Marzullo, editors, *Tenth International Workshop on Distributed Algorithms (WDAG'96)*, volume 1151 of *Lecture Notes in Computer Science*, pages 89–104. Springer-Verlag, October 1996.
  - [26] Michel Charpentier. Description de systèmes réactifs répartis à partir d'une sémantique par entrelacement. In *Actes des Rencontres francophones du Parallélisme (RenPar'8)*. Bordeaux, France, May 1996.
  - [27] Michel Charpentier, Mamoun Filali, Philippe Mauran, Gérard Padiou, and Philippe Quéinnec. Observer pour répartir. In *Journées du GDR programmation*, Grenoble, France, November 1995.
  - [28] Michel Charpentier, Abdellah El Hadri, and Gérard Padiou. A UNITY-based algorithm design assistant. In *Workshop on Tools and Algorithms for the Construction and Analysis of Systems (TACAS'95)*, pages 131–145. BRICS Notes Series NS-95-2, May 1995.
  - [29] Michel Charpentier, Mamoun Filali, Philippe Mauran, and Gérard Padiou. Aider à la conception d'algorithmes répartis. In *Actes des journées sur la Formalisation des Activités Concurrentes (FAC'93)*, Toulouse, France, November 1993. CERT-IRIT-LAAS.
  - [30] Michel Charpentier. Assistance au raffinement de programmes répartis. In *Journées des Jeunes Chercheurs en Systèmes Informatiques Répartis*, pages 137–142, Grenoble, France, April 1993.
- Dissertations.**
- [31] Michel Charpentier. *Assistance à la Répartition de Systèmes Réactifs*. PhD thesis, Institut National Polytechnique de Toulouse, France, November 1997.
  - [32] Michel Charpentier. Assistance au raffinement de programmes répartis. Rapport de DEA informatique fondamentale et parallélisme, Institut National Polytechnique de Toulouse, July 1993.