Damian Martin Lyons

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Professional Preparation:

9/86	**Ph.D.**	**Computer Science.** University of Massachusetts, Amherst MA.
8/81	**M.Sc.**	**Computer Science.** Trinity College, University of Dublin, Ireland.
6/80	**B.A.I.**	**Electrical Engineering**. Trinity College, University of Dublin, Ireland.
6/79	**B.A.**	**Mathematics**. Trinity College, University of Dublin, Ireland.

Citizenship: US.

Positions held:

09/02 ---- **Director, Robotics & Computer Vision Laboratory**
Department of Computer & Information Science, Fordham University, NY.

07/06 06/11 **Department Chair**
Department of Computer & Information Science, Fordham University, NY.

07/03 06/06 **Associate Chair for Graduate Studies**
Department of Computer & Information Science, Fordham University, NY.

09/02 ---- **Associate Professor**
Department of Computer & Information Science, Fordham University, NY.

06/01 06/02 **Research Department Head, Video & Display Processing Department**
Philips Research, Briarcliff Manor NY 10510.

10/96 06/01 **Principal Member, Research Staff**
Philips Research, Briarcliff Manor NY 10510.

10/86 10/96 **Senior Member, Research Staff**
Philips Research, Briarcliff Manor NY 10510.

06/84 08/84,
06/85 08/85 **Adjunct Instructor**
Dept. of Computer and Information Science, Univ. of Massachusetts, Amherst MA.

1981 1982 **Lecturer**
Computer Science Department, Waterford Institute of Technology, Ireland.

Research Interests:

- Robot task planning and programming, formal analysis of plans/programs including sensor, robot and environment models, process algebra and FSA/port-automata analysis.

- Landmark detection from vision and depth information, way-finding, mapping and cognitive robotics; Cluster computing applications in robotics. Hybrid reactive-deliberative robot architectures, adaptive planning,
- Computer vision, visual target tracking, depth and image sensing, point-cloud processing, automated surveillance, visual event detection, fusion of visual cues, automated camera handoff, augmented and virtual reality interfaces.

Professional Activities:

- ***Senior Member** of* IEEE; Computer Society, Robotics Society, Society for Pattern Analysis and Machine Intelligence, and Society for Systems, Man and Cybernetics
- ***Member*** Association for Computing Machinery.
- ***Advisory Board/Research Consultant:*** Honeywell-ActivEye Inc., Pleasantville NY, 2003-09.
- ***Steering Committee*** IEEE International Symposium on Assembly and Task Planning 1998-2005.
- ***Chair, Organizing committee*** IEEE International Symposium on Assembly & Task Planning, Pittsburgh 1995.
- ***Program Co-Chair*** IEEE International Symposium on Assembly & Task Planning, Marina del Ray 1997.
- ***Journal Editorial Boards:*** ISRN Robotics, 2012 — current.
- ***Guest Editor*** IEEE Transactions on Robotics & Automation, Special Issue on Assembly & Task Planning (Feb'96).
- ***Technical Committee Chairman*.** IEEE Robotics & Automation Society, Assembly and Task Planning Technical Committee, 1992-1996.
- ***Co-Organizer:***
  - Special Session on *Fusion in Cognitive Robotics*, SPIE Symposium on Defense and Security, Orland, FL 2010-2012***;***
  - Workshop on *Special Architectures for Robotics*, IEEE International Symposium on Robotics and Automation 1988.
- ***Chair of sponsor/vendor committee*** International Conference on Cyber Security, Manhattan, NY, 2009, 2010.
- ***Member*** NCITS/MPEG-4 US delegation 1998, participated in MPEG4 core experiments in SNHC.
- ***Program Committees*:**
  - Latin American Robotics Symposium, 2008-12.
  - Multisensor, Multisource Information Fusion: Architectures, Algorithms, and Applications, SPIE Defense and Security Symposium 2007-2012.
  - International Conference on Cyber Security, Manhattan NY, 2009-10.
  - International Conference on Computer Vision Theory and Applications, Setubal, Portugal, 2006.
  - IEEE International Conference on Robotics and Automation, Barcelona Spain, 1997, 2005;
  - IEEE International Conference on Advanced Video and Signal Surveillance, 2003, 2005;
  - IEEE International Conference on Multisensor Fusion & Integration, 1996, 2003;
  - IEEE International Symposium on Assembly & Task Planning 1997;
  - Joint IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS) 1997;
  - 4th European Conference on Planning (ECP'97), Toulouse, France, 1997.

- OE / IFIP / IEEE International Conference on Integrated and Sustainable Industrial Production, Lisbon Portugal 1997;
- International Conference on Balanced Automation Systems, Lisbon Portugal, 1996;
- AAAI Spring Symposium on Error Detection in Manufacturing Systems, Stanford University, Stanford CA, 1994;
- Workshop on Computational Theories of Interaction and Agency, University of Chicago, Chicago IL, 1994;
- Workshop on Schemas and Neural Networks, USC, Los Angeles CA, 1993.

- ***Have reviewed for****:*
  - IEEE: Computer, Expert, Transactions on Robotics & Automation, Transactions on Automation Science & Engineering, Transactions on Automatic Control;
  - Others: Information Sciences, Real-Time Imaging, Artificial Intelligence, Journal of AI Research, Robotics & Autonomous Systems, Robotica, Journal of Parallel & Distributed Computation, EURASIP Journal on Applied Signal Processing, Elsevier Journal of Real-Time Imaging; Journal of Ambient Intelligence and Smart Environment, Journal of Intelligent and Robotics Systems.
  - Government Agencies: NSF, NSERC, Austrian Science Fund.

- ***Master's Committees:***
  - Andrew Palumbo, 2004, M.S. Thesis, Fordham University, Department of Computer and Information Science. (Reader)
  - Kiran Pamnany, 2005, M.S. Thesis, Fordham University, Department of Computer and Information Science. (Advisor)
  - Jizhou Ai, 2006, MS Thesis, Fordham University, Department of Computer and Information Science. (Reader)
  - Qiang Ma, 2008, MS Thesis, Fordham University, Department of Computer and Information Science. (Reader)
  - Hong-Da Shih, 2008, MS Thesis, Fordham University, Department of Computer and Information Science. (Reader)

- ***Doctoral Committees:***
  - Thomas G. Murphy, 1996 (co-advisor), Sc.D. Dissertation, University of Massachusetts Lowell, Dept. of Computer Science. "An Investigation into the Use of Deliberative Information as a Resource for Reactive System Decision Making."
  - Paul Blaer, 2008 (reader), Ph.D. Dissertation, Columbia University, New York, Dept. of Computer Science. "Mobile robot data acquisition and viewpoint planning for building site models."

Honors and Awards:

- Jeffcott-McNeill Prize for Engineering 1980, Trinity College, University of Dublin, Ireland.
- Philips Research Individual Research Award 1997.
- Philips Research Group Research Award 1998.
- Philips International Corporate Research Exhibit (CRE), 1998, 2001.
- Nominated for CRE Presidents Award 2001.

- Inventor/Co-inventor on 14 US Patents and 7 European Patents issued for work in Robotics and Computer Vision.
- Distinguished paper award: Hsu, D.F., Lyons, D.M., A Dynamic Pruning Strategy for Real-Time Tracking, *IEEE International Conference on Advanced Information Networking and Applications*, March 2005, Taipei Taiwan.
- Excellence in Teaching, Fordham *CSTEP/STEP* May 2010.

Funding:

- Philips Research USA. July 2002. Completed.
- Fordham College at Rose Hill. July 2002. Completed.
- Fordham University Office of Research. June 2003-4. Completed.
- Fordham University, Graduate School of Arts and Sciences, Summer 2004. Completed.
- US Dept. of Defense. October 2005-6. Completed.
- Fordham University, Office of Research. May 2006-7. Completed.
- Mr. Z. Wang / SPCorp Inc. (Co-PI). June 2007-8. Completed.
- US Dept of Energy, (Co-PI), September 2008-11. Completed.
- US Defense Threat Reduction Agency, 2010-13. Ongoing.

Significant Projects

Significant Academic Projects:

07/11 --- **Performance Guarantees For Robotic C-WMD Missions** (2 PIs, 4 GRAs)
Federally funded (DTRA) research program to develop automated verification tools for robot missions operating in dynamic & uncertain environments. Preliminary results include software package for verifying robot missions in probabilistically specified environments; Three peer-reviewed publications to date and one in review.
Joint Project with Prof. Ron Arkin of Georgia Institute of Technology.
Additionally funds two graduate research assistants at each site.

07/09 --- **Cognitive Robotics**
Joint research with Prof. Paul Benjamin of PACE University.
Results include integration of 3D physics engine with computer vision to support prediction of complex environment interactions by comparison of real and synthetic imagery. Five peer-reviewed publications to date in national/international venues.

09/08 05/11 **Cluster Computing for Robotics and Computer Vision** (1PI, 2 undergrads)
Federally funded (DoE) research program to develop cluster computing algorithms for robot navigation and robot teams. Results include a novel spatial-image representation, the *Terrain Spatiogram* (3 peer-reviewed publications) as well as a book on cluster computing for robotics and computer vision published by WorldScientific in 2010.

10/05 10/06 **Rotational Legged Locomotion** (1PI, 1 GRA)
Federally funded (Army Office of Research) research program, to design and build a prototype for an energy-efficient tripedal surveillance and reconnaissance robot. Results include ODE simulation model of mechanism and full-size prototype (three peer-reviewed publications).

10/02 10/05 **Combinatorial Image Fusion for Automated Target Tracking**.
Joint university funded research with Prof. Frank Hsu, CIS Dept. Fordham. Results include novel approach to image fusion for target tracking with increased robustness to target occlusions.

Significant Industrial Projects:

10/98 06/01 Eye in the Sky: Automated Surveillance Contract Project (3-7 people)
Objective: Develop automated surveillance software for intruder tracking, content analysis for monitoring and video indexing, and residential security. Project management compliant with CMM level 2 procedures.
Contribution: *Project Leader*. Management and coordination of research team, customer interaction, as well as many R&D contributions. Deliverables included research and software modules for Map-based Camera Control, Automated tracking, Content Analysis and Residential motion detection.

1996 10/98 **Adaptive Multimodal User Interface Research Project** (2.5 people)
Objective: Develop adaptive user interface technology based on computer vision and speech input channels for use in consumer and semi-professional applications.
Contribution: *Project Leader*. Responsible for planning & implementing research in this novel product area. The main deliverable was the *Multimodal Interactive Advertising* demonstration.

1995 1996 **Camera-Based Gesture Recognition Contract/Research Project**
Objective: Develop a computer vision based user interface for interaction with a VR or multimedia application via human body motions. Integrated with a speech input subsystem.
Contribution: *Project Leader*. Ported MIT ALIVE system. Developed additional software to use Philips DSP chips for body tracking and general purpose software for body feature identification. Developed several application demonstrators. Organized workshop with designers/product managers to plan transfer of technology. Participated in company-wide multimodal sounding board to plan multimodal research strategy.

1993 1995 **Intelligent Lighting Control Contract Project.**
Objective: Developed PC supervised, wireless control system for building lighting.
Contribution: Developed software module to globally optimize energy consumption in building lighting.

1991 1993 **ADAPT Toolkit Contract Project**
Objective: Develop programming toolkit for control and simulation of placement robots, exploiting planner-reactor approach developed in previous project.
Contribution: *Project Leader*. Met all code delivery deadlines and toolkit was used within product division.

1986 1991 **Adaptive Task Planning Research Project**
Objective: Enhance AI Task Planning to handle uncertain and dynamic applications.
Contribution: Developed planner-reactor approach; a formal approach to integrating classical (AI) planning with a reactive (behavior-based) approach. Implemented and evaluated system on a kitting robot application. Developed task representation language (based on Ph.D. work), implemented task execution module (both uni- & multiprocessor versions); developed mathematical semantics for language, developed techniques for analyzing liveness and efficiency of robot programs.