

Lubomir Bourdev

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Education

Doctor of Philosophy in Computer Science, U.C. Berkeley 09/2007 – present.
Master of Science in Computer Science, Brown University 09/1994 – 05/1998.
Bachelor of Arts in Computer Science, Brown University 09/1994 – 05/1998.

Computer Science Experience

Senior Research Scientist, Advanced Technology Labs, Adobe Systems (06/98 - present)

Invents and prototypes new technologies for future versions of the Adobe product line, and for future products.
Author of 40+ pending or issued patents
Author of seven major features shipped in Illustrator, Acrobat, InDesign, and Photoshop Elements.

My recent research at Adobe has revolved around detecting and recognizing people in personal photo collections. I invented [the Soft Cascade](#) (CVPR05) - a method for detection of faces in digital images, which is shown to be among the most accurate real-time detectors (used in Photoshop Elements, Premiere Elements as well as in a camera phone [prototype](#)). I also invented the [Poselets](#) method for recognizing articulated objects (ICCV09), which is currently the leading method in detecting people according to [PASCAL VOC](#) competitions. I have been working on GPU optimization of the soft cascade face detector and on identity recognition using co-occurrence, gender, clothes and names. I am the lead architect of the engine behind the [People Recognition](#) feature in Photoshop Elements 8.0 as well as the [Face Tagging](#) module back in Photoshop Elements 4.0. To my knowledge this was the first consumer-level application of face detection and has received positive [reviews](#) from PC Magazine, Digital Journal, Imaging Resource and others.

Other major software engineering projects on which I was the first or the only author:

- Designed and developed [Symbolism](#) - a creative tool in Illustrator using my particle system to simplify drawing of complex natural scenes, such as grass, trees, shading, hair, clouds. It has received outstanding [reviews](#).
- I designed and developed the probabilistic engine in Acrobat forms that suggests default entries in form fields. It can extrapolate appropriate values for fields and forms it has not seen before.
- First author of the [Generic Image Library \(GIL\)](#) – a [Boost](#) library that separates image representations from algorithms on images and allows writing algorithms that can apply on any image without compromising performance. Many companies and universities use GIL.
- [AGM Flattener](#), a module that converts documents containing semi-transparent graphics into opaque documents. It is used for printing and export across the entire vector graphics product line (Acrobat, Illustrator, InDesign and future RIPs).
- [Flattening Preview](#) - an interactive transparency-focused print preview, now used in Acrobat, Illustrator and InDesign.
- Participated in the definition of the formulas of the Adobe Transparency Model and PDF 1.4. Selected as the Chief Technologist of an internal company committee designed to guide and track evolution of the vector transparency model in Adobe applications.

Graduate Student in Computer Vision, EECS U.C. Berkeley (09/07 - present)

- Advisor: [Prof. Jitendra Malik](#)
- Research focus: Object recognition and people detection
- Proposed a novel method for detection of articulated objects using [Poselets](#). Our method won the person detection competition of the [PASCAL](#) Visual Object Classes challenge of 2009 and 2008

Computer Graphics Researcher, Brown University Graphics Group (09/96 - 05/98)

- Project: *Rendering Non-Photorealistic Strokes with Temporal and Arc-Length Coherence*. Exploring methods for preserving coherence in NPR animations.

- Project: *Constant Frame Rate Terrain Rendering*. Group research in rendering height-fields and dynamically simplifying the mesh to preserve constant frame rates.
- Project: *Real-Time Non-Photorealistic Rendering*. Group project for extracting silhouette and NPR rendering of meshes. (SIGGRAPH 97)
- Project: *Art-Based Rendering of Fur, Grass and Trees*. Continuation of our work, allowing for selective control of the level of detail. (SIGGRAPH 99)
- Other graphics [projects](#).

Software Engineer, Cosmo Software, [Silicon Graphics](#) (06/97 - 08/97)

- Participated in the development of CosmoWorlds, a professional VRML authoring tool.
- Designed and implemented a converter from Inventor 2.1 to VRML 2.0.
- Created a VRML Billboard Editor.

Cognition Research Assistant, [Cognitive Science Department](#) Brown University (12/95 - 06/96)

- Researched models of categorization and concept formation in humans.
- Implemented a neural network to simulate and statistically evaluate the models.
- Awarded Undergraduate Research Assistantship.
- Related class [projects](#) include HMMs for part of speech tagging, rule-based tri-language machine translation (by constructing the Lambda Calculus expression), and a Prolog NL parser/expert system.

Head Teaching Assistant, [Computer Science Department](#) Brown University [Algorithms and Data Structures](#), [Prof. Roberto Tamassia](#) (01/97 - 05/97)

- Managed a team of 10 Teaching Assistants in a class of over 100 students.
- Conducted weekly help sessions to the entire class.
- Developed significant part of the support code and the programming assignments.

Teaching Assistant, [Computer Science Department](#) Brown University [Introduction to Computer Graphics](#), [Prof. Andries van Dam](#) (09/96 - 12/96) [Algorithms and Data Structures](#), [Prof. Roberto Tamassia](#) (01/96 - 05/96) [Concepts and Challenges of Computer Science](#), [Prof. Peter Wegner](#) (01/95 - 05/95)

- Participated in the course reorganization and development.
- Handled electronic broadcasting of the course.
- Held office hours; graded student assignments.

Java Developer, [Computer Science Department](#) Brown University, (09/96 – 01/97)

- Project: Applications of Java in Data Structure visualization.
- Implemented an interactive data structure environment in Java.
- Built time manager for user-controlled forward/backward animation.

University Tutor, Brown University, (09/95 – 12/95)

- Taught object-oriented programming and introductory calculus.

Publications

- L. Bourdev, J. Malik, [Poselets: Body Part Detectors Trained Using 3D Human Pose Annotations](#), ICCV 2009
- L. Bourdev, *Generic Image Library*, Software Developer's Journal, August 2007.
- L. Bourdev, J. Järvi, [Efficient Run-Time Dispatching in Generic Programming with Minimal Code Bloat](#), Science of Computer Programming, 2010. Note: To appear
- L. Bourdev, J. Järvi, [Efficient Run-Time Dispatching in Generic Programming with Minimal Code Bloat](#), LCSD Workshop, OOPSLA 2006.
- L. Bourdev, J. Brandt, [Robust Object Detection via Soft Cascade](#), CVPR 2005.

- M. Kowalski, L. Markosian, J.D. Northrup, L. Bourdev, R. Barzel, L. Holden, J. Hughes, [Art-Based Rendering of Fur, Grass, and Trees](#), SIGGRAPH 1999. (front cover image)
- L. Markosian, M. Kowalski, S. Trychin, L. Bourdev, D. Goldstein, J. Hughes, [Real-Time Nonphotorealistic Rendering](#), SIGGRAPH 1997.

Issued Patents

- L. Bourdev, *Method and Apparatus for Calibrating Sampling Operations for an Object Detection Process*, U.S. Patent 7616780
- L. Bourdev, *Facilitating Computer-Assisted Tagging of Object Instances in Digital Images*, U.S. Patent 7587101
- L. Bourdev, G. Wilensky, *Detection of Objects in an Image using Color Analysis*, U.S. Patent 7580563
- P. Asente, T. Pettit, L. Bourdev, M. Schuster, *Assigning Region Attributes in a Drawing*, U.S. Patent 7502028
- L. Bourdev, S. Schiller, M. Newell, *Processing Illustration Artwork*, U.S. Patent 7495675
- L. Bourdev, *Method and apparatus for calibrating sampling operations for an object detection process*, U.S. Patent 7440587
- L. Bourdev, *Autocompleting Form Fields Based on Previously Entered Values*, U.S. Patent 7343551
- L. Bourdev, M. Newell, *Creating and Manipulating Related Vector Objects in an Image*, U.S. Patent 7339597
- A. Parenteau, L. Bourdev, *Selectively transforming overlapping illustration artwork* U.S. Patent 7262782
- L. Bourdev, S. Schiller, *Processing Complex Regions of Illustration Artwork*, U.S. Patent 7256798
- L. Bourdev, *Previewing the Effects of Flattening Transparency*, U.S. Patent 7181687
- L. Bourdev, M. Newell, *Operations on Related Set of Vector Objects*, U.S. Patent 7123269
- P. Louveaux, L. Bourdev, *Hierarchical 2D Compositing with Blending Mode and Opacity Controls at All Levels*, U.S. Patent 7102651
- L. Bourdev, S. Schiller, *Processing Complex Regions of Illustration Artwork*, U.S. Patent 6894704
- L. Bourdev, S. Schiller, *Flattening Images with Abstracted Objects*, U.S. Patent 6859553
- P. Louveaux, L. Bourdev, *Hierarchical 2D Compositing with Blending Mode and Opacity Controls at All Levels*, U.S. Patent 6847380
- L. Bourdev, S. Schiller, M. Newell, *Processing Illustration Artwork*, U.S. Patent 6720977
- L. Bourdev, *Processing Opaque Pieces of Illustration Artwork*, U.S. Patent 6515675
- L. Bourdev, J. Brandt, *Detecting Objects in an Image Using a Soft Cascade*, U.S. Patent 7634142
- L. Bourdev, *Displaying Detected Objects to Indicate Grouping*, U.S. Patent 7636450

Invited Talks

- [Using Poselets for Detection and Segmentation](#), [The PASCAL Visual Object Classes Challenge Workshop](#) 10/09
- [Generic Image Library](#), Parasol Lab, Texas A&M University ([Prof. Bjarne Stroustrup](#)), 03/06
- [Generic Image Library](#), Open Systems Lab, Indiana University ([Prof. Andrew Lumsdaine](#)), 01/06

Awards and Affiliations

- One of two employees accepted into the Adobe University Sabbatical program, which allows me to pursue my Ph.D. while employed at 75% salary. Adobe also covers my Ph.D. tuition with a forgivable loan subject to continued employment.
- One of eight students in a class of 1300+ elected into the Brown University Combined Program, which allowed me to complete both Bachelor's and Master's degrees in a total of four years.
- Undergraduate Teaching and Research Assistantship, Brown University, 1995.
- The Soros Foundation Educational Grant, 1994.
- National Competition of Computational Linguistics in Bulgaria, Second place, 1994.
- National Competition of Computational Linguistics in Bulgaria, First place, 1992.
- Member of Sigma Xi and Mensa.