Christoph Bregler

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EDUCATION

University of California, Berkeley, CA, 09/93 – 05/98

Ph.D. in Computer Science, 1998, M.S., 1995
Thesis: Computational Models of Human Motion
Advisors: Jerome A. Feldman, Jitendra Malik

University of Karlsruhe, Germany, 10/87 – 09/93

Diplom in Computer Science, 1993
Thesis: Computer Lipreading
Advisor: Alex Waibel

PROFESSIONAL EMPLOYMENT

New York University, Computer Science Dept., Courant Institute, New York, 09/04 – present

Associate Professor (tenured): Vision, Graphics, Motion-Capture, Learning, and New Media.

New York University, Computer Science Dept., Courant Institute, New York, 09/02 – 08/04

Assistant Professor: Vision, Graphics, Motion-Capture, Learning, and New Media.

Stanford University, Computer Science Department, CA, 01/99 – 08/02

Assistant Professor: Vision, Graphics, Learning.

Disney Feature Animation, Burbank, CA, 2001 + 2002

Consultant: Vision Based Motion Capture for Gemeni Project (Facial Animation)
In Lance William's Group.

New York University, Courant Institute/Media Research Lab, New York, 08/98 – 01/99

Visiting Scholar: Research on Vision and Animation,
In Ken Perlin's/ Davi Geiger's group.

Interval Research Corp., Palo Alto, CA, 05/95 – 10/97

Consultant: Developed Facial Animation System: Video Rewrite
In Malcolm Slaney's and Michele Covell's group

University of California, Berkeley, Computer Science Dep. and ICSI, 01/93 – 07/98

Research Assistant: Statistical Learning, Visual-Acoustic Speech Recognition,
Object Recognition, Human Body Tracking/Animation
In Stephen Omohundro's, Jerry Feldman's, Nelson Morgan's,
and Jitendra Malik's Group.

Hewlett-Packard Laboratories, Palo Alto, CA, 09/91-03/92

Software Engineer: Developed System Software for Physician's Workstation Project
In Paul Tang's group.

San Francisco State University, San Francisco, CA, 04/91-03/92

Visiting Scholar: Research on Neural Networks. In Gerald Eisman's group.

Hewlett-Packard, Research and Development, Waldbronn, Germany, 10/90-04/91
Part-time Software engineer, Firmware development for HP's Liquid Chromatography system.

Memorex-Telex PC Division, Milpitas, CA, 07/90-10/90
Intern. Hardware testing, marketing research.

Fraunhofer Institute, FhG, Karlsruhe, Germany, 10/88-7/90

Research Assistant: Implemented Human Body tracking system.
In Prof. Nagel's and Karl Rohr's group.

IBM Research and Development, Boeblingen, Germany, 07/8910/89
Intern. Software tools development.

IBM Development Lab, Sindelfingen, Germany, 07/88-10/88
Intern. Software tools development.

HONORS

- Reese Prosser Memorial Lecture 2005 (Dartmouth)
- *Program Chair*, SIGGRAPH 2004, Computer Animation Festival & Electronic Theater
- *Sloan Research Fellow*, 2003, 2004
- *Olympus Prize*, 2002, (German Vision / AI Society DAGM honors every year 1 outstanding scientist)
- *I.E. Block Community Lecture,* 50th Anniversary of SIAM community, 2002
- *IEEE CVPR 2001 Best Student Paper* (Co-Author / Advisor of student)
- *Stanford Terman Fellow,* 1999
- *Stanford Joyce Faculty Fellow,* 1999

OTHER PROFESSIONAL ACTIVITY

Editorial Boards:

International Journal of Computer Vision (Kluwer)
Foundations and Trends in Computer Graphics and Vision (Now Publishers)
Graphical Models (Academic Press)

Program Committees:

IEEE CVPR 2007
ACM SIGGRAPH Papers 2006
ACM SIGGRAPH Papers 2005
Area Chair for IEEE CVPR, 2005
ACM SIGGRAPH Electronic Theater & Computer Animation Festival, Chair 2004
IEEE CVPR, Madison, Wisconsin, 2003,
AAAI, Edmonton, Alberta, Canada 2002,
Eurographics, Sarbruecken, Germany, 2002,

Pacific Graphics, Beijing, China, 2002,
IEEE CVPR, Hawaii, 2001,
Graphics Interface, Ottawa, Ontario, Canada, 2001,
IEEE Workshop on Human Motion, Austin, TX 2001,
Area Chair for IEEE CVPR, Hilton Head, SC, 2000,
IEEE Workshop on Human Modeling, Hilton Head, SC, 2000,
Vision, Modeling, and Visualization, Stuttgart, Germany, 2001,
IEEE Computer Animation, Seoul, Korea, 2001,
IEEE Computer Animation, Philadelphia, 2000,
ACM SIGGRAPH Animation Sketches, New Orleans, 2000,
Audio-Visual Speech Processing, Santa Cruz, 1999,
IEEE Int. Workshop on Modeling People, Corfu, Greece, 1999

Other Boards:

Professional Advisory Committee, Dance Notation Bureau, NYC
Judge, 2004/2005/2006 Tisch School of Arts, Feature Film Grants from Sloan Foundation

Review Panels:

NSF review panel, 2007
NSF review panel, 2005
NSF review panel, 2003
NSF review panel, 2002
NSF review panel, 2001
NSF review panel, 1998

Reviewer:

MacArthur Foundation, ACM SIGGRAPH, SCA, Advances in Neural Information Processing Systems, IEEE CVPR, EE Computer Animation, IEEE Int. Conf on Robotics and Automation,
Int. Journal on Computer Vision, Trans. on Pattern Analysis and Machine Intelligence, Journal of Computer Vision and Image Understanding, Trans. On Image Processing, Journal on Artificial Intelligence Research, Journal of VLSI Signal Processing Systems For Speech, Image, and Video Technology.

GRANTS

ONR Grant: Intrinsic Biometrics for Human Motion Signatures. 05/07 – 04/09
PI: C. Bregler, $280K / 2 years

NSF Grant: Laban Capture, Perceptual Models of Dynamics. 09/03 – 09/06
PI: C. Bregler, Co-PI: Ted Warburton (Dance Education), Peggy Hackney (IMS);
$672K / 3 years

NSF Grant: ITR: New Technology for the Capture, Analysis and Visualization of Human Movement. 09/03 – 09/07
PI: R. Chellappa, UMD, Co-PI, C.Bregler, NYU, J Jeka, T. Andriacchi, Stanford, L. Davis, UMD;
NYU part $320K / 3 years

Sloan Research Fellow, 09/03 – 09/05, $40K / 2 years

ONR-MURI Detecting Human Activity with a network of vision sensors. 10/01 – 10/04

PIs: J. Malik, Co-PIs: C. Bregler, D. Forsyth, J. Canny, S. Russell, M. Jordan, P. Perona, M. Mataric;
Subcontract for $750K / 5 years (to NYU now)

NSF Grant: Models of Human Kinematics, 09/00 – 08/03
PI: Bregler; $340K / 3 years

NSF CISE Research Instrumentation: High-Speed Motion Acquisition, 09/00 – 08/03
PI: Bregler, Co-PI: Andriacchi, Hanrahan;
$200K / 3 years

Stanford BIO-X: "Move-to-a-Cure" 10/00 – 10/02
Collaboration with Medical School to analyze Movement Disorders.
PI: Bronthe-Steward, Co-PI: Bregler; Alexander
$200K / 2 years

Stanford Office of License and Technology Research Incentive grant for Cartoon Capture, 2001
PI: Bregler, Loeb; $25K

Stanford Terman Fellowship, 1999-2001

Stanford Noyce Faculty Scholarship, 1999-2000

Gift Fund from Electronic Arts, 2001, $45K

Gift Fund from Microsoft Research, 2000, $20K

California MICRO, Interval, Recognition of Human Motion in Video, 07/96-07/98
Faculty PI: J. Feldman; Student PI: C. Bregler;
$100K / 2 years

PUBLICATIONS

Refereed Papers

Learning Motion Style Synthesis from Perceptual Oversvations
Lorenzo Torresani, Peggy Hackney, Christoph Bregler
To Appear in Proc. Of Neural Information Processing (NIPS) 2006.

Squidball: An Experiment in Large Scale Motion Capture and Game Design
C. Bregler, C. Castiglia. J. DeVincenzo, L. Dubois, K. Feeley, T. Igoe, J. Meyer, M. Naimark, A. Postelnicu, M. Rabinovich, S. Rosenthal, K. Salen, J. Sudol, B. Wright
Proc. Intelligent Technologies for Interactive Entertainment (INTETAIN) 2005, Springer Lecture Notes in Artificial Intelligence

Mood Swings: Expressive Speech
Erika Chuang, Chris Bregler
Transactions on Graphics 2005

Speaking with Hands: Creating Animated Conversational Characters from Recordings of Human Performance
M. Stone, D. DeCarlo, I. Oh, C. Rodriguez, A. Stere, A. Lees, C. Bregler
Proc. *ACM SIGGRAPH* 2004.

Estimation of skeletal kinematics through high feature density video based motion capture
Gene Alexander, Tom Andriacci, Chris Bregler
Eighth International Symposium on the 3-D Analysis of Human, 2004

Twist based Acquisition and Tracking of Animal and Human Kinematics
Christoph Bregler, Jitendra Malik, Kathy Pullen
Int. *Journal of Computer Vision* (IJCV), 56(3), 179-194, 2004.

Learning Non-Rigid 3D Shape from Video
Lorenzo Torresani, Aaron Hertzmann, Christoph Bregler
To Appear in *Proc. Of Neural Information Processing Systems* (NIPS) 2003.

Nonrigid Modeling of Body Segments for Improved Bone Motion Esitmation
Eugene J. Alexander, Christoph Bregler, Tom P. Andriacchi
Computer Modeling in Engineering and Science, Vol. 4, Number 3 & 4, pp. 351-364, 2003.

Facial Expression Space Learning,
Erika Chuang, Hrishi Deshpande, Christoph Bregler
Proc. *Pacific Graphics*, 2002.

Turning to the Masters: Motion Capturing Cartoons
Chris Bregler, Lorie Loeb, Erika Chuang, Hrishi Deshpande
Proc. *ACM SIGGRAPH* 2002, 399-407.

Motion-Capture assisted Animation: Texturing and Synthesis
Kathy Pullen, Chris Bregler
Proc. *ACM SIGGRAPH* 2002, 501-508.

Space-Time Tracking
Lorenzo Torresani, Chris Bregler
Proc. *European Conference of Computer Vision* (ECCV), 2002, 801-812.

CVPR Best Student Paper Award:

Tracking and Modelling Non-Rigid Objects with Rank Constraints
Lorenzo Torresani, Danny Yang, Gene Alexander, Christoph Bregler
Proc. *IEEE Computer Vision and Pattern Recognition* (CVPR), 2001.

Limb Segment Pose from Range Data Streams Through Homogenous Factorization
Eugene J. Alexander, Christoph Bregler, Tom P. Andriacchi
BED-Vol.50, Bioengineering Conference ASME 2001.

Animating by Multi-level Sampling
Katherine Pullen and Christoph Bregler
Proc. IEEE Computer Animation 2000, 36-42.

Recovering Non-Rigid 3D Shape from Image Streams
Christoph Bregler, Aaron Hertzmann and Henning Biermann
Proc. IEEE Computer Vision and Pattern Recogniion (CVPR), *2000,* 2/690-696.

Tracking People with Twists and Exponential Maps
Christoph Bregler and Jitendra Malik
*Proc. IEEE Computer Vision and Pattern Recognition (*CVPR), 1998. 8-15.

Video Rewrite: Driving Visual Speech with Audio

Christoph Bregler, Michele Covell, and Malcolm Slaney
Proc. ACM SIGGRAPH 1997, 353-360.

Learning and Recognizing Human Dynamics in Video Sequences
Christoph Bregler
Proc. *IEEE Computer Vision and Pattern Recognition* (CVPR), 1997.

Learning Appearance Based Models: Mixtures of Second Moment Experts
Christoph Bregler, Jitendra Malik
Advances in Neural Information Processing Systems (NIPS), 1996, 845-850.

Eigen-Points
Michele Covell, Christoph Bregler
Proc. *IEEE Int. Conf. on Image Processing* (ICIP), 1996.

Finding Naked People
Margaret M. Fleck, David A. Forsyth, Christoph Bregler
Proc. 4'th European Conf. Computer Vision, Cambridge, UK, (ECCV) 1996, 594-602.

Nonlinear Manifold Learning for Visual Speech Recognition
Christoph Bregler, Stephen M. Omohundro
Int. Conf. Computer Vision (ICCV), 1995, 494-499.

Nonlinear Image Interpolation using Manifold Learning
Christoph Bregler, Stephen M. Omohundro
*Advances in Neural Information Processing Systems (*NIPS), 1994, 973-980.

"Eigenlips" for Robust Speech Recognition
Christoph Bregler, Yochai Konig
Proc. IEEE Int. Conf. on Acoustics, Speech, and Signal Processing, Adelaide, Australia, 1994.

Surface Learning with Applications to Lipreading
Christoph Bregler, Stephen M. Omohundro
Advances in Neural Information Precessing Systems (NIPS), 1993, 43-50.

Improving Connected Letter Recognition by Lipreading
Christoph Bregler, Herman Hild, Stefan Manke, Alex Waibel
in *Proc. IEEE Int. Conf. on Acoustics, Speech, and Signal Processing,* 1993.

Bimodal Sensor Integration on the Example of "Speachreading"
Christoph Bregler, Stefan Manke, Herman Hild, Alex Waibel
Proc. of IEEE Int. Conf. on Neural Networks, 1993.

Pending Papers, Technical Reports:

Robust Model-Free Tracking of Non-Rigid Shape
Lorenzo Torresani, Aaron Hertzmann, Christoph Bregler

Head-E-Motions
Erika Chuang, Christoph Bregler

Performance Driven Facial Animation using Blendshapes
Erika Chuang, Christoph Bregler

Invited Book Chapters / Papers / Keynotes:

The Annual Reese Prosser Memorial Lecture: The Modern Mathematics of Motion Capture – From Muybridge through Disney and Beyond, Dartmouth College, Oct, 2005

Invited I.E. Block Community Lecture (Plenary Talk) SIAM 50th Anniversary and 2002 Annual Meeting, Philadelphia, 2002

Key-Note Speaker at Dynamics Workshop, European Conference on Computer Vision (ECCV) 2002,

Key-Note Speaker at Vision, Modeling, and Visualization (VMV), 2000.

ACM SIGGRAPH Image Based Modeling and Rendering Tutorial, 1998,1999,2000

Probabilistic Models of Verbal and Body Gestures
C.Bregler, S.Omohundro, M.Covell, M.Slaney, S.Ahmad, D.A.Forsyth, J.A.Feldman
as chapter in *Computer Vision in Man-Machine Interfaces* (R. Cipolla and A.Pentland eds), Cambridge University Press, 1998

Video Rewrite
C.Bregler, M.Covell, M.Slaney
Machines that Learn, Snowbird, Utah, 1998
and
Imagina, Monaco, 1998

Learning Visual Motion Models for Lip Reading
Christoph Bregler, Stephen M. Omohundro
Chapter in *Motion-Based Recognition*, (M. Sha and R. Jain eds), Kluwer Academic Press, 1996.

Finding Objects in Image Databases by Grouping
J. Malik, D. Forsyth, M. Fleck, H. Greenspan, T. Leung, C. Carson, S. Belongie, and C. Bregler
Proc. IEEE Int. Conf. on Image Processing (ICIP-96), special session on ``Images in Digital Libraries" , 1996.

A Hybrid Approach to Bimodal Speech Recognition
C.Bregler, S.Omohundro, Y.Konig
in *Proc. of 28th Annual Asilomar Conf. on Signals, Systems, and Computers, Pacific Grove, CA 1994.*

PATENTS:

US Patent 5,880,788: Automated synchronization of video image sequences to new soundtracks
Christoph Bregler
Issued March-9, 1999

US Patent 6,188,776: Principle component analysis of images for the automatic location of control points
Michele Covell, Christoph Bregler
Issued Feb-13, 2001

US Patent 6,888,549: Method, apparatus and computer program for capturing motion of a cartoon and retargetting the motion to another object
Christoph Bregler, Lorie Loeb
Issued May-03, 2005

OTHER MEDIA: (Not systematically tracked)

Business Week, April 2nd, 2007: Video on businessweek.com/extras

SIGGRAPH 2004 Interviews:

Animation Magazine, Sep 2004, "The Quest for the Best Eye Candy"
Animation Magazine, Sep 2004, "The Next MoCap Frontier: Animation With Soul"
Computer Graphics World, Aug 2004, Portfolio, SIGGRAPH Electronic Theater
Computer Graphics World, Sep 2004, Portfolio, SIGGRAPH Animation Theater
Variety, August 9-15, 2004, "Aping Mother Nature"
Hollywood Reporter, Aug 6-8, 2004, "Geek Week"
Millimeter, June 2004, "An Animation Celebration", (published again in Video Systems)
Millimeter, May 4, 2004, SIGGRAPH Announces Best Animated Short & Jury Award (also VFX Pro)
Shoot, Aug 6, 2004, "Fine Art Collection"
CG Channel 07/20/04, SIGGRAPH Computer Animation Festival.
Animation Flash, June 26, 2004, SIGGRAPH Sets Computer Animation Festival Program
Sony Pictures Imageworks Moves forward with IMAGE MOTION (in *Channel 5 News*, *VFXWorld)*
NHK (Japanese TV). Sep-19, 2004 1h documentary "Digital Stadium: SIGGRAPH2004 Special"
G4Tech TV, Aug 11, 2004

New York Times, 10/09/03*,* Decoding the Subtle Dance of Ordinary Movements
New York 1 TV, 08/13/03, NYU Motion Capture Lab Coverage
SIAM News, Vol 36, 3, 04/03, Step by Step (Article about Kathy Pullen + some of our research)
Technology Review, 11/30/02, Automating Animation
Computer Graphics World, 02/20, Masterful Animation
CG Focus, , 12/03/01, Cartoon Motion Capture
Technology Review, 06/30/00, Lying With Pixels
NBC Nightly News, 09/14/97, Video Rewrite coverage
Los Angeles Times, 09/01/97, Article about Video Rewrite