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Annotated Filmography

This document has been composed for the purpose of illuminating my contributions to projects that are the products of collaborative work in a commercial environment that is not consistently supportive of public disclosure about specific techniques and discoveries. The information listed is composed for brevity and to clarify my role in the work. Projects are listed in reverse chronological order after first being grouped by the scope of my responsibility. Of importance to note are the dates during which ILM/Lucasfilm was developing specific techniques relative to when those techniques were widely adopted across the visual effects industry.

A. Associate Visual Effects Supervisor / Front End Supervisor
   Responsibility for overall project artistic and technical supervision, secondary to the visual effects supervisor.
   1. **Untitled feature film project**. Fully animated feature film development project. Directed by George Lucas. Produced by Lucasfilm Animation. Project indefinitely postponed in August 2007.
      * Significance of the project:
        – Through this project Lucasfilm Ltd. pushed technology for *z-viz*, the in-house proprietary software developed for pre-visualization projects. The technology is a direct result of George Lucas' stated goal for non-expert users, such as himself and fellow directors, to be able to manage the storyboarding process in a 3D format. The ultimate goal of *z-viz* is to replace 2D storyboarding with 3D information that is (a) more informative about visual space and movement, and (b) integrate the development of assets used in story development with pre-production and post production.
        – This project pushed the use of digital asset management tools for camera layout and scene dressing. These tools had previously been developed by Vincent Toscano for the Lucasfilm Animation's work on *The Clone Wars* animated television series. My contribution to this effort was to refine the process of classification, definition of variations, and placement tools used for efficiently generating and swapping related types of models and textures in a scene.
        – Lucasfilm Ltd. is committed to integrating tools and processes across its family of companies including Lucasfilm Animation, Industrial Light & Magic, and LucasArts.
      * My contributions:
        – Reported to: Tony Plett, Visual Effects Supervisor, Rob Coleman, Animation Director, and Catherine Winder, Producer.
        – Directly reporting to me were the Modeling and Surfacing Supervisor, Martin Murphy and Rigging Supervisor, Ben Cheung. There were approximately 15 artists on their combined teams.

- Within the *zviz* effort I developed the process permitting the use of facial animation on digital characters. This effort required specification and testing of workflow and coordination with project software engineer Jeffrey Yost.
- I spearheaded the effort to introduce character rigging techniques common to feature animation projects, such as FK/IK switching and squash and stretch controls, to the procedural character rig generation tool, called *BlockParty*, developed Jason Smith and Jeff White, and used on visual effects projects at ILM. The specific rigging methods introduced were developed by Ben Cheung.
- Scholarly publications detailing derived from this project:
  - Sullivan, S., Williams, C., Porcino, N., and Bullock, D. 2007. LucasArts and ILM: a course in film and game convergence. In *ACM SIGGRAPH 2007 Courses* (San Diego, California, August 05 - 09, 2007). SIGGRAPH '07. ACM, New York, NY, 1. DOI= http://doi.acm.org/10.1145/1281500.1281638
  - Smith, J. and White, J. 2006. BlockParty: modular rigging encoded in a geometric volume. In *ACM SIGGRAPH 2006 Sketches* (Boston, Massachusetts, July 30 - August 03, 2006). SIGGRAPH '06. ACM, New York, NY, 115. DOI= http://doi.acm.org/10.1145/1179849.1179993

2. ***Project 880 (Avatar Test)****.* Prototype test project for feature film viability. Director James Cameron. Produced by Lightstorm Entertainment. Visual effects by Industrial Light & Magic.
   - Significance of the project:
     - In summer 2005 Lightstorm Entertainment hired ILM to develop a fully realized test sequence of a scene in the script as a proof-of-concept for the performance capture, virtual sets, visual design of characters and environments, and stereo technology. The larger goal of the test was to gain the confidence of studio funding, primarily from Twentieth Century Fox. This test was delivered in February 2006 and was ultimately successful in gaining the support Lightstorm needed in order to enter full production.
   - My contributions:
     - Reported to: Dennis Muren and Eric Brevig, Visual Effects Supervisors, and Janet Lewin, Visual Effects Producer.
     - Directly reporting to me were Hayden Landis, Digital Production Supervisor, Michael Koperwas, Modeling Supervisor, and Nelson Sepulveda, Compositing Supervisor. I worked in coordination with Michael Sanders, Motion Capture Supervisor and Steve Sullivan, Director of R&D.
     - I was responsible for all character and creature related issues, including defining for James Cameron how ILM's proprietary techniques for facial performance capture simultaneous with body performance capture would work in the context of Rob Legato's virtual photography set. After Visual Effects Supervisor Eric Brevig left the project to direct *Journey to the Center of the Earth* I supervised the on-set performance capture sessions, working under Cameron's direction and in coordination with ILM's R&D team led by Steve Sullivan. As the project moved into production of character design realization and fully rendered shot production Dennis Muren joined the ILM team as Visual Effects Supervisor.

B. Creature Supervisor
   Project-wide responsibility for all artistic and technical digital character processes -modeling, rigging, deformations, texturing, dynamics, and the geometry pipeline.
   1. ***Son of the Mask****.* Live action feature film theatrically released February 2005. Directed by

Lawrence Guterman. Produced by Dark Horse Entertainment, Distributed by New Line. Visual effects by Industrial Light & Magic. Production budget: $84 million. Estimated worldwide box office: $57.5 million.

- Significance of the project:
    - One of two projects on which my primary role was the mentorship of artists new to the role of Creature Supervisor.
    - Notable for effort to create a fully CG digital double toddler, suitable for close-up shots.
- My contributions:
    - Reported to: Ed Hirsch, Visual Effects Supervisor, Tom Bertino, Animation Supervisor, and Ned Gorman, Visual Effects Producer.
    - Mentorship of Co-Creature Supervisor, Corey Rosen.

2. *Lemony Snicket's A Series of Unfortunate Events*. Live action film theatrically released December 2004. Directed by: Brad Silberling. Produced by Paramount Pictures. Visual effects by Industrial Light & Magic. Production budget: $140 million. Estimated worldwide box office: $209 million.

- Awards and recognitions for project:
    - Nomination for 2004 Visual Effects Society Award for Outstanding Performance by an Animated Character in a Live Action Motion Picture.
- Significance of the project:
    - This project is notable for effort to create a fully CG digital double toddler, Sunny, suitable for close-up shots. The majority of development work to create this effect was completed prior to when I joined the project. I co-supervised the final completion of the key shots, including cloth and hair simulation for Sunny.
- My contributions:
    - Reported to: Stefan Fangmeier, Visual Effects Supervisor, Colin Brady, Animation Supervisor, and Jeff Olsen, Visual Effects Producer.
    - Mentorship of Co-Creature Supervisor, Michelle Dean, simultaneously while working with Corey Rosen on *Son of the Mask*.
- Scholarly publications derived from this project:
    - Pighin, F. and Lewis, J. P. 2005. Introduction. In *ACM SIGGRAPH 2005 Courses* (Los Angeles, California, July 31 - August 04, 2005). J. Fujii, Ed. SIGGRAPH '05. ACM, New York, NY, 1. DOI= http://doi.acm.org/10.1145/1198555.1198581
- Notable press related to this project:
    - Robertson, B. "A baby performs impossible acts in extremely close-up scenes thanks to a digital double created at ILM for Lemony Snicket", *Computer Graphics World*, http://www.panoscan.com/PanoPress/2005Press/Lemony/LemonySnicket.html

3. *Van Helsing*. Live action feature film theatrically released May 2004. Directed by Stephen Sommers. Produced by Universal Pictures. Visual effects by Industrial Light & magic. Production budget: $160 million. Estimated worldwide box office: $300.2 million.

- Awards and recognitions for this project:
    - Nomination for 2004 Academy of Science Fiction, Fantasy & Horror Films, USA (Saturn Award) for Best Special Effects;
    - Nomination for 2004 Visual Effects Society Award for Outstanding Special Effects in Service to Visual Effects in a Motion Picture.
- Significance of this project:
    - As a result of the extensive digital creature related R&D effort on this project ten

members of my team paired with software engineers from ILM's R&D department to describe and disseminate information on the advances at SIGGRAPH 2004.
- – On-screen werewolf skin ripping transformation effects featuring use of cloth dynamics with art-directable and tension based spring snapping.
- – Sequences featuring actresses in complex layered costumes with on-screen transitions to their digital doubles with accurate representations of their costumes followed by art-directable transformations to vampire bride form in which portions of the costumes form the creature's wings.
- – Use of flesh dynamics for Mr. Hyde character; features tetrahedral tessellation method for polygonal mesh volumes with regular distribution, and introduction of conjugant gradient component to solver; these two achievements created greater overall stability and control over the visual results for artists.
- – Increased visual believability through modeling, simulation, artistic control, and rendering of both short and long hair.
- – "Match-a-mation" of actor performance for precise alignment and replacement with digital characters.
- – Use of digital animatics to pre-plan both camera and actor performance in hybrid shots featuring the photographed facial performance of actresses blended with CG neck-through-lower body and wings for vampire brides.
- My contributions:
  - – Reported to: Scott Squires, Visual Effects Supervisor; Ben Snow, Visual Effects Supervisor; Daniel Jeannette, Animation Supervisor, and Gretchen Libby, Visual Effects Producer.
  - – Direct reports to me included Modeling Supervisor, Andrew Cawrse; Technical Animation Lead, Lee Fulton; Lead Texture Artist, Jean-Claude Langer; along with their crews of all digital modelers, texture artists, creature development artists, and character dynamics artists. Total number approximately 35.
  - – Supervised pre-production creature design and creature effects development along with ILM Art Department and R&D department to ensure translation from art department through realization of CG models and creature effects techniques. Creature design and art direction was handled by ILM Art Department with Christian Alzmann, Carlos Huante, and Brian O'Connell.
- Scholarly publications derived from this project:
  - – Sumner, N., Rapkin, A., Aplin, S., Cawrse, A., Fulton, L., Pelle, T., Peterson, P., and Wong, E. 2004. There's more than one way to skin a wolf: wolf transformations in "Van Helsing": Copyright restrictions prevent ACM from providing the full text for this work. In *ACM SIGGRAPH 2004 Sketches* (Los Angeles, California, August 08 - 12, 2004). R. Barzel, Ed. SIGGRAPH '04. ACM, New York, NY, 52. DOI= http://doi.acm.org/10.1145/1186223.1186288
  - – Bridson, R., Marino, S., and Fedkiw, R. 2003. Simulation of clothing with folds and wrinkles. In *Proceedings of the 2003 ACM Siggraph/Eurographics Symposium on Computer Animation* (San Diego, California, July 26 - 27, 2003). Symposium on Computer Animation. Eurographics Association, Aire-la-Ville, Switzerland, 28-36.
  - – Kautzman, R., Maiolo, A., Griffin, D., and Buecker, A. 2004. Jiggly bits and motion retargeting: bringing the motion of Hyde to life in Van Helsing with dynamics: Copyright restrictions prevent ACM from providing the full text

- Notable press related to this project:
  - Duncan, J. "Van Helsing: Man Made Monsters". *Cinefex* July 2004. 98. Pp. 98-124. Print.
  - Mallory, M. "Feel Their Pain: 'Van Helsing' Brings Creature Feature Standbys Up to Date". *Los Angeles Times* 6 May 2004. http://articles.latimes.com/2004/may/06/news/wk-movies6
  - Gross, E. "Die Monsters Die". *CFQ Cinefantastique* April-May 2004. 34. Pp. 34-40, 70-71. Print.

4. *Dreamcatcher.* Live action feature film theatrically released March 2003. Directed by Lawrence Kasdan. Produced by Castle Rock Entertainment. Distributed by Warner Bros. Visual effects by Industrial Light & Magic. Production budget: $68 million. Estimated worldwide box office: $75.7 million.
   - Significance of this project:
     - To my knowledge this was the first use of sub-surface light scattering in a visual effects film. This rendering effect was used extensively on the alien digital creatures Mr. Gray A, Mr. Gray B, and the S*weasel. Technique development primarily spear-headed by John Walker, David Horsley, and Christophe Hery. Later industry-wide recognition for this development came through the 2003 Academy of Motion Picture Arts and Sciences Technical Achievement Award for implementation of practical methods for rendering skin and other translucent materials.
     - Possibly first use of rigid body dynamics to create physically plausible "rag doll" behavior of digital characters with deformable surfaces. Used here for Mr. Gray B creatures impacted by explosions. Original exploration of technique for feature film production was done by Hiromi Ono for *Hulk* (2003) released three months after *Dreamcatcher*. Her work built upon the use of rigid body dynamics for the battle droids in *Star Wars: Episode I "The Phantom Menace"* (1999).
   - My contributions:
     - Reported to: Stefan Fangmeier, Visual Effects Supervisor, Hal Hickel, Animation Supervisor, and Jeff Olson, Visual Effects Producer.
     - Directly reporting to me were Andrew Cawrse, Model Supervisor, and Keiji Yamaguchi, Lead Technical Animator.
     - My responsibility to this sub-surface scattering development effort included over-seeing proper modeling and deformation of geometry to work with the light scattering shaders.
     - Branko Grujcic created the "rag doll" rigid body set-ups under my direction.
   - Scholarly publications derived from this project:
     - Horsley, D. F. 2003. Mr. Gray B. puts on a happy face. In *ACM SIGGRAPH 2003 Sketches & Applications* (San Diego, California, July 27 - 31, 2003). SIGGRAPH '03. ACM, New York, NY, 1-1. DOI= http://doi.acm.org/10.1145/965400.965493
     - Hery, C. 2005. Implementing a skin BSSRDF: (or several..). In *ACM SIGGRAPH 2005 Courses* (Los Angeles, California, July 31 - August 04, 2005). J. Fujii, Ed. SIGGRAPH '05. ACM, New York, NY, 4. DOI= http://doi.acm.org/10.1145/1198555.1198584
     - Kačić-Alesić, Z., Nordenstam, M., and Bullock, D. 2003. A practical dynamics system. In *Proceedings of the 2003 ACM Siggraph/Eurographics Symposium on Computer Animation* (San Diego, California, July 26 - 27, 2003). Symposium on Computer Animation. Eurographics Association, Aire-la-Ville, Switzerland, 7-16.

5. *Men In Black II*. Live action feature film theatrically released July 2002. Directed by Barry Sonenfeld. Produced by Amblin Entertainment. Distributed by Columbia Pictures. Visual effects by Industrial Light & Magic. Production budget: $140 million. Estimated worldwide box office: $441.8 million.
   - Awards and recognitions for the project:
     - Nomination for 2002 Visual Effects Society Award for Best Visual Effects in an Effects Driven Motion Picture.
   - Significance of the project:
     - Use of Maya and in-house developed tools to procedurally generate the Serleena creature, an animatable, multi-tendriled, plant.
     - Internal development of significantly more robust, realistic, and stable cloth simulation techniques used on digital versions of the worm guys and digital doubles of MIB agents Kay and Jay.
   - My contributions:
     - Reported to John Berton, Visual Effects Supervisor; Erik Mattson, Associate Effects Supervisor; Tom Bertino, Animation Supervisor, and Ned Gorman, Visual Effects Producer.
     - Directly reporting to me were Modeling Supervisor, Ken Bryan, Viewpaint Supervisor, Catherine Craig, and all other creature development artists for rigging, deformations, and dynamics.
     - Supervised pre-production creature design and creature effects development along with ILM Art Department and R&D department to ensure translation from art department through realization of CG models and creature effects techniques. Creature design and art direction was handled by ILM Art Department with David Nakabayashi, Christian Alzmann and Carlos Huante.
   - Scholarly publications derived from the project:
     - Bridson, R., Fedkiw, R., and Anderson, J. 2002. Robust treatment of collisions, contact and friction for cloth animation. In *Proceedings of the 29th Annual Conference on Computer Graphics and interactive Techniques* (San Antonio, Texas, July 23 - 26, 2002). SIGGRAPH '02. ACM, New York, NY, 594-603. DOI= http://doi.acm.org/10.1145/566570.566623
6. *Jurassic Park III*. Live action feature film theatrically released July 2001. Directed by Joe Johnston. Produced by Universal Pictures.   Visual effects by Industrial Light & Magic. Production budget: $93 million. Estimated worldwide box office: $368.7 million.
   - Awards and recognitions for project:
     - Nomination for 2001 Academy of Science Fiction, Fantasy & Horror Films, USA (Saturn Award) for Best Special Effects
     - Nomination for 2001 Satellite Awards (Golden Satellite Award) for Best Visual Effects.
   - Significance of the project:
     - This was the first project, to my knowledge, to employ the role of Creature Supervisor. This role is the equivalent of a CG Supervisor in reporting structure, but with specific responsibility for digital creature development issues including all modeling, texturing, rigging, deformations, dynamics, and the geometry pipeline for production. This role and organizational structure has since been widely adopted within the industry for large digital character intensive projects. 3D animation companies will typically use the synonymous term Character Supervisor

- – Large-scale extension of earlier flesh simulation developments created at ILM for *The Mummy* (1999). Improvements included more detailed rigging and action of muscles used internal collisions objects for the tetrahedral flesh meshes.
- My contributions:
  - – Reported to: Jim Mitchell, Visual Effects Supervisor, Dan Taylor, Animation Supervisor, and Mark Miller, Visual Effects Producer.
  - – Direct reports to me included Ken Bryan, Modeling Supervisor; Jean-Claude Langer, Viewpaint Supervisor; and Technical Animation Supervisor, Dennis Turner.
  - – Development of the role of Creature Supervisor, along with ILM Production Manager Ken Maruyama.
  - – Technical Animation Supervisor, Dennis Turner, R&D Supervisor John Anderson, and I developed a muscle rigging and flesh simulation system for seven different dinosaur models. We were inspired by the visual weight given by flesh simulation in Disney's *Dinosaur* (2000).
- Scholarly publications derived from this project:
  - – Wang, X. C. and Phillips, C. 2002. Multi-weight enveloping: least-squares approximation techniques for skin animation. In *Proceedings of the 2002 ACM Siggraph/Eurographics Symposium on Computer Animation* (San Antonio, Texas, July 21 - 22, 2002). SCA '02. ACM, New York, NY, 129-138. DOI= http://doi.acm.org/10.1145/545261.545283
  - – 2001. INDUSTRIAL LIGHT + MAGIC: Research and Development 2001. In *ACM SIGGRAPH 2001 Video Review on Electronic theater Program* (August 12 - 12, 2001). SVR '01, vol. 138. ACM, New York, NY, 23. DOI= http://doi.acm.org/10.1145/945314.945337
- Notable press related to the project:
  - – Deckel, L. "Jurassic Park III: Bigger, Faster, Meaner". *Cinefex*. October 2001. 87. Pg. 29.

C. <u>Creature Development Supervisor</u>

Project-wide responsibility for a sub-set of digital character processes -deformations, dynamics and the geometry pipeline.

1. ***War of the Worlds***. Live action feature film theatrically released June 2005. Directed by Steven Spielberg. Produced by Paramount Pictures. Visual effects by Industrial Light & Magic. Production budget: $132 million. Estimated worldwide box office: $591.7 million.
   - Awards and recognitions for the project:
     - – Nomination for 2005 Academy of Motion Picture Arts and Sciences Award (Oscar) for Best Achievement in Visual Effects.
     - – Won 2005 Visual Effects Society Award for Best Single Visual Effect.
     - – Won 2005 Visual Effects Society Award for Outstanding Compositing in a Motion Picture.
     - – Won 2005 Visual Effects Society Award for Outstanding Models and Miniatures in a Motion Picture.
     - – Nomination for 2005 Academy of Science Fiction, Fantasy & Horror Films, USA (Saturn Award) for Best Special Effects.
     - – Nomination for 2005 Satellite Awards for Best Visual Effects.
   - Significance of the project:
     - – This project is notable within the visual effects industry for significantly altering the scheduling structure, and therefore the pricing structure, of visual effects

driven films. Through the expertise of director Steven Spielberg and his key creatives, including Visual Effects Supervisor Dennis Muren, this production went from concept to final print in approximately one year, with a post production schedule lasting only 12 weeks. Subsequently, many productions have attempted to follow this model.

- – While pursuing an aggressive production schedule ILM introduced its next generation production integration software, called *zeno*, to be used on a trial basis on *War of the Worlds*. A key goal of *zeno* was reversal of the industry trend toward specialization by providing artists with control over many aspects of visual effects artistry through a single piece of software while also permitting elements to originate from a wide variety of vendor tools.
- • My contributions:
  - – Reported to Dennis Muren, Visual Effects Supervisor, Pablo Helman, Visual Effects Supervisor, Randal Dutra, Animation Director, and Curt Miyashiro, Digital Production Supervisor.
  - – Directly reporting to me were approximately 15 artists responsible for character rigging, deformations, dynamics and the geometry pipeline.
  - – My responsibility to this effort was to work with ILM's software engineers to turn the *zeno* into production-ready software capable of meeting the demands of intense digital creature work, and develop processes that ILM's artists could follow to implement *zeno* efficiently with the required artistic control.
- • Notable press related to the project:
  - – Fordham, J. "War of the Worlds: Alien Apocalypse". *Cinefex* October 2005. 103. Pg. 87.
  - – Cohen, D. "Blockbusters take toll on f/x shops". *Variety*. May 25, 2007. http://www.variety.com/article/VR1117965871?refCatId=2520

1. *CG Yoda Test*. Fully computer generated test of the feasibility of replacing the puppet Yoda with a computer animated character for Star Wars Episode II (early 2000). Director George Lucas. Produced by Industrial Light & Magic. Budget undisclosed.
   - • Significance of the project:
     - – Results of project led to the replacement of hand-puppeteered Yoda with a CG Yoda in subsequent Star Wars films *Episode II – Attack of the Clones* (2002) and *Episode III – Revenge of the Sith* (2005). The 2005 DVD re-release, and 2012 theatrical re-release of *Episode I – The Phantom Menace* have also been altered to replace the hand-puppeteered Yoda with the digital version.
   - • My contributions:
     - – Reported to Rob Coleman, Animation Director.
     - – Responsible for deformations and the geometry pipeline.
2. *Brother Termite Test*. Fully computer generated test of the feasibility of facial motion capture re-targeted to a non-human face. Client: James Cameron. Produced by Industrial Light & Magic. Budget undisclosed.
   - • Significance of the project:
     - – Taking place in late 1999 this project was, to my awareness, the first commercial use of image based capture for facial performances. We captured the performance of a human actor and retargeted the results to a model with abstracted human facial forms. I was responsible for rigging and deformations on both the model used in the facial performance capture and the model used as a key-frame driven comparison.

- My contributions:
  - Reported to Christian Rouet, Head of R&D.
  - Responsible for the deformations and geometry pipeline of both the performance capture test and the key-frame animated version used for comparison.
3. *The Hauting*. Live action feature film theatrically released July 1999. Directed by Jan de Bont. Produced by DreamWorks. Visual effects by Industrial Light & Magic. Production budget: $80 million. Estimated worldwide box office: $177.3 million.
   - My contributions:
     - Reported to: Scott Farrar, Visual Effects Supervisor.
     - Setup deformations and wrangled the geometry pipeline on CG characters featured in a key sequence in the film in which sculptural figures in relief on a door come to life.
4. *Star Wars: Episode I "The Phantom Menace"*. Live action feature film theatrically relased may 1999. Directed by George Lucas. Produced by Lucasfilm Ltd. Visual effects by Industrial Light & Magic. Production budget: $115 million. Estimated worldwide box office: $924.3 million (not counting the 2012 stereographic re-release)
   - Awards, and recognitions for project:
     - Nominated for 1999 Academy of Motion Pictures Arts and Sciences Award (Oscar) for Best Achievement in Visual Effects.
     - Won 1999 Academy of Science Fiction, Fantasy & Horror Films, USA (Saturn Award) for Best Special Effects.
     - Nominated for 1999 British Academy of Film and Television Arts (BAFTA) for Best Achievement in Special Visual Effects.
     - Nominated for 1999 Las Vegas Film Critics Award for Best Visual Effects;
     - Nominated for 1999 Satellite Award for Best Single Visual Effects.
   - Significance of the project:
     - At the time of its development and release Episode I was by far the largest and most complicated visual effects production ever undertaken. The total number of visual effects shots was over 900. The previous record was somewhere around 400 (by comparison, the first Jurassic Park, released just six year earlier, had only around 40 shots).
     - The total number of different digital characters was 67.
     - Jar Jar Binks was the first digital character to be widely critiqued as an actor, as opposed to being talked about as a digital character. Though the commentary was generally negative, this reaction established the character as believable, and thus successful and effective from a visual effects point of view.
     - Rigid body dynamics were used for character animation battle droids being destroyed. The control systems, process of transitioning from key-frame to dynamics, and method for integration into the production pipeline was developed by Jim Hourihan, Cary Phillips, and James Tooley.
     - John Anderson, Jim Hourihan, Cary Phillips and Sebastian Marino received Technical Achievement Awards in 2002 from the Academy of Motion Pictures Arts and Sciences for the development of the ILM Creature Dynamics System. The system was largely developed for Star Wars Episode I.
   - My contributions:
     - Reported to: Visual Effects Supervisors Joe Letteri, Dennis Muren, Scott Squires, and John Knoll; Animation Director Rob Coleman, and visual effects producers Jeff Olsen, Ned Gorman, and Judith Weaver.

- Directly reporting to me were approximately two dozen creature development artists.
- In the fall of 1996, in early pre-production, I proposed the creation of a new role, called Zookeeper, with the responsibility of managing all of the digital model assets and the trouble-shooting the geometry pipeline. This was pre-cursor to the Creature Supervisor role, though more limited in scope of responsibility.
- As part of the Zookeeper role I developed a script based asset management tool that could be accessed by all artists updating model assets and all artists pulling assets into shots with appropriate listing in *caricature* shotfiles. This tool employed a database and numbering system to ensure that model assets and their accompanying files were kept in sync. To my knowledge, this system was the first use of an asset management system in visual effects production.
- This project initiated the role now known in the industry as Creature Developer, Creature TD, or Character TD. Two teams of digital artists worked the entire length of production, one under the direction of James Tooley concentrating on character rigging and rigid body dynamics, and one under my direction focusing on deformations, cloth & hair simulations, asset management, and geometry pipeline troubleshooting. Technical artists specializing in and dedicated to character setup and character effects is now common industry-wide and as an area of study.
- Jar Jar's ear animation employed both key-frame animation with standard joint-based deformations and cloth simulations. Control was provided to the creature development artists through a system of animatable cloth parameters and area maps. The cloth engine, accessed through the in-house software tool *caricature*, was developed initially by Jim Hourihan with application testing and direction from CG Supervisor Doug Smythe. I inherited the project and developed it specifically for tests of Jar Jar as a digital character capable of carrying a lead role in the film.
- Working with software engineer John Anderson I adapted pipeline integration techniques, methods for determining dynamics attributes, and use of area maps for control for use of the cloth engine on cloth and cloth-like parts of characters throughout the film. The methods proved to be robust, extensible, and artistically manageable enough that cloth and hair dynamics were used on over 20 digital characters and produced by more than a dozen digital artists.
- This project introduced *carienv*, a tool for defining the influence of multiple transforms on multiple surfaces as volumes of influence rather than parametrically. I developed specifications for the tool and led development from the creature artist's point of view. Vishwa Ranjan engineered the software under the supervision of Cary Phillips. I originally setup Jar Jar's skin deformations using *ienv*, the parametric enveloping system. Once *carienv* was ready for production Aaron Ferguson used it to re-envelope Jar Jar. Aaron Pfau extended its functionality by combining volumetric definition of joint influences with the surface-to-surface property transfer function of the cloth dynamics system. The combined effect permitted highly smooth deformation falloff delineations to be transferred to highly irregular surfaces.
- Scholarly publications derived from this project:
  - McLaughlin, T. and Anderson, J. 1999. Cloth animation for Star Wars: Episode I "The Phantom Menace". In *ACM SIGGRAPH 99 Conference Abstracts and*

Applications (Los Angeles, California, United States, August 08 - 13, 1999). SIGGRAPH '99. ACM, New York, NY, 195. DOI= http://doi.acm.org/10.1145/311625.311999
- McLaughlin, T. and Phillips, C. 1999. Creature wrangling and enveloping for Star Wars: Episode I "The Phantom Menace". In *ACM SIGGRAPH 99 Conference Abstracts and Applications* (Los Angeles, California, United States, August 08 - 13, 1999). SIGGRAPH '99. ACM, New York, NY, 196. DOI= http://doi.acm.org/10.1145/311625.312001
- Taylor, J. and Hourihan, J. 1999. Technical animation issues for the battle droids of Star Wars: (Episode I "The Phantom Menace"). In *ACM SIGGRAPH 99 Conference Abstracts and Applications* (Los Angeles, California, United States, August 08 - 13, 1999). SIGGRAPH '99. ACM, New York, NY, 206. DOI= http://doi.acm.org/10.1145/311625.312019
- Notable press related to the project:
    - Duncan, J., Martin, K. H., Cotta Vaz, M. "The Phantom Menace: Hero's Journey". *Cinefex*. July 1999. *78*. Pg 92.
    - Williams, P. J. "Racial ventriloquism". *The Nation*. June 17, 1999. http://web.archive.org/web/20060920011550/http://www.thenation.com/doc/19990705/williams

A. Creature Developer
Character specific responsible for deformations and dynamics; Responsible to the Creature Supervisor or Computer Graphics Supervisor
1. **Eragon.** Live action feature film theatrically released December 2006. Directed by Stefan Fangmeier. Produced by Fox 2000 Pictures. Visual effects by Industrial Light & Magic. Production budget: $100 million. Estimated worldwide box office: $249.4 million.
    - Significance of the project:
        - Notable for the use of a photo-real computer generated lead character, the dragon Saphira, in a live action production.
    - My contributions:
        - Reported to: Aaron Ferguson, Creature Supervisor.
        - I joined the crew during final months of shot production to assist in shape animation, rigid body, cloth, hair, and flesh dynamics working primarily on the lead digital creature, the dragon Saphira.
2. *Pirates of the Caribbean – Dead Man's Chest.* Live action feature film theatrically released July 2006. Directed by Gore Verbinski. Produced by Walt Disney Pictures. Visual effects by Industrial Light & Magic. Production budget: $225 million. Estimated worldwide box office: $1.06 billion.
    - Awards and recognitions for this project:
        - Won 2006 Academy of Motion Picture Arts and Sciences Award (Oscar) for Best Achievement in Visual Effects.
        - Won 2006 British Academy of Film and Television Arts (BAFTA) Award for Best Achievement in Special Visual Effects.
        - Won 2006 Visual Effects Society Award for Best Single Visual Effect.
        - Won 2006 Visual Effects Society Award for Outstanding Animated Character in a Live Action Motion Picture.
        - Won 2006 Visual Effects Society Award for Outstanding Visual Effects in a

Visual Effects Driven Motion Picture.
- Won 2006 Academy of Science Fiction, Fantasy & Horror Films, USA (Saturn Award) for Best Special Effects.
- Won 2006 Hollywood Film Festival Award for Visual Effects of the Year;
- Won 2006 Satellite Award for Best Visual Effects
- Significance of the project:
  - Notable for its use of optical motion tracking to achieve motion capture performances during first unit filming. This led to tighter integration of the computer generated pirate crew characters with the live action actors and backgrounds. This technology was recognized for its impact on filmmaking with a 2009 Academy of Motion Picture Arts and Sciences Technical Achievement Award.
  - Notable for high level of photo-realism achieved in the rendering and secondary animation performance of Davey Jones and his crew. Most viewers mistakenly believed these digital characters were actors in prosthetic makeup and suits.
  - Davey Jones' tentacle beard featured user controllable impulse driven rigid body dynamics and "stiction" to dynamically create and destroy spring connections between the tentacle skin and other surfaces. I was the Creature TD responsible for creating the tentacle animation, flesh, and hair simulations for approximately eight shots featuring Davey Jones and his crew.
- My contributions:
  - Reported to: James Tooley, Creature Supervisor.
  - I joined the crew during final months of shot production to assist in shot production for the shape, rigid body, cloth, hair, and flesh dynamics of Davey Jones and his pirate crew.
- Scholarly publications derived from the project:
  - Criswell, B., Derlich, K., and Hatch, D. 2006. Davy Jones' beard: rigid tentacle simulation. In *ACM SIGGRAPH 2006 Sketches* (Boston, Massachusetts, July 30 - August 03, 2006). SIGGRAPH '06. ACM, New York, NY, 117. DOI= http://doi.acm.org/10.1145/1179849.1179995

3. *The Island*. Live action feature film theatrically released June 2005. Directed by: Michael Bay. Produced by DreamWorks SKG. Visual effects by Industrial Light & Magic. Production budget: $126 million. Estimated worldwide box office: $162.9 million.
   - Significance of the Project
     - Project was the second to use ILM's new proprietary 3D graphics software system, *zeno,* as the backbone of the visual effects production pipeline.
     - Notable for its use of digital doubles to handle stunt-work for lead characters.
   - My contributions:
     - Reported to Eric Brevig, Visual Effects Supervisor, and Scott Benza, Animation Director. Coordinated closely with Andy Buecker, Creature Supevisor.
     - My primary responsibility was to carryover knowledge and techniques from *War of the Worlds* to the artists on *The Island*.

5. *The Adventures of Rocky and Bullwinkle*. Live action feature film theatrically released June 2000. Directed by Des McAnuff. Produced by Capella International. Distributed by Universal Pictures. Visual effects by Industrial Light & Magic. Production budget: $76 million. Estimated worldwide box office: $35.1 million.
   - Significance of the project:

- To my knowledge, this project was the first live action feature film to include cel shaded, also known as "toon shaded", CG characters.
  - My contributions:
    - Reported to: Aaron Ferguson, Creature Development Supervisor; and Cary Phillips R&D software developer.
    - My primary responsibility on the project involved developing a deformation technique for the lead characters (Rocky and Bullwinkle) that would result in highly smooth curved b-spline surfaces suitable for use of cel shaders.

B. Technical Director

Asset and/or shot specific responsibility for a variety of processes -deformations, lighting, compositing, pipeline testing.

1. ***ObaQ Process Management Testing***. In-house Industrial Light & Magic production tools development project to test the production readiness of software for managing processes across the ILM network.
   - Significance of the project:
     - Taking place in 1996 this effort was the first, to my knowledge, job queuing system for large scale digital productions that incorporated a systemic view of managing computing resources and processes. There are many tools on the market today to accomplish this task, but at the time having the capability of organizing processes by available machines, machine processing power, memory, and priority was novel.
   - My contribution:
     - Reported to: Euan MacDonald, Production Software TD.
     - I was responsible for organizing, running, and measuring the results of tests reflecting the way process management tools would be used in production by technical directors.

2. ***Mars Attacks!*** Live action film theatrically released December 1996. Directed by Tim Burton. Produced by Warner Bros. Visual effects by Industrial Light & Magic. Production budget: not available. Estimated worldwide box office: $101.3 million.
   - Awards and recognitions:
     - Nominated 1996 Academy of Science Fiction, Fantasy & Horror Films, USA (Saturn Award) for Best Special Effects.
     - Nominated for 1996 Satellite Award for Best Single Visual Effects.
   - Significance of the project:
     - Originally in development as a live action film with stop-motion animated Martian characters.
   - My contributions:
     - Reported to Visual Effects Supervisor Jim Mitchell and CG Supervisor Roger Guyett.
     - In late 1995 I was Technical Director for a test shot supervised by Jim Mitchell, animated by David Andrews, and produced by Mark Miller in which we demonstrated the effectiveness of a using digital characters for the Martians using background plates from the stampede sequence in *Jumanji*. The success of this test shot helped convince Tim Burton and Warner Bros. that ILM could produce CG Martians with the same look and movement of stop motion animation.
     - Responsible for deformations on all digital characters and wrangling the geometry pipeline.

- Developed models used for sequence featuring Sarah Jessica Parker's head attached to the body of a Chihuahua. Adapted digital puppy model from *101 Dalmations* for use as Poppy the Chihuahua, complete with fur maps. Lit, rendered and composited three shots in the sequence.
- Techniques for interactively handling crowd animation scenes within ILM's proprietary softward, *caricature*, were developed by Roger Guyett and Andy White with Cary Phillips from ILM's R&D team. I helped wrangle the use of *caricature* and geometry pipeline issues by technical directors and animators.
    - Notable press related to the project:
        - Cotta Vaz, M. "Mars Attacks!: Martial Art". *Cinefex*. December 1996. 68. Pg. 73.
3. ***BMW Penguins***. Live action 30-second commercial broadcast in 1996. Director: Steve Beck. Client: Fallon McElligott for BMW of North America. Budget: not available.
    - Awards and Recognitions:
        - Won 1995 Clio Gold Award
    - My contributions:
        - Reported to: CG Supervisor Doug MacMillan.
        - I was responsible for helping to transfer fur rendering setup and techniques from *Jumanji* to use as downy feathers on CG penguins.
4. ***Jumanji***. Live action feature film theatrically released December 1995. Directed by Joe Johnston. Produced by TriStar Pictures. Visual effects by Industrial Light & Magic. Production budget: $65 million. Estimated worldwide box office: $162.3 million.
    - Awards and recognitions:
        - Won 1995 Academy of Science Fiction, Fantasy & Horror Films, USA (Saturn Award) for Best Special Effects.
    - Significance of the project:
        - Extended ILM's fur rendering techniques developed first for the digital character, Kitty, in *The Flintstones* (1994). Used extensively for the digital lion. This work was managed by CG Supervisors Carl Frederick and Doug Smythe, with significant contributions from Christophe Hery. Jeff Yost, David Benson, Florian Kainz, John Horn, and ILM's Head of R&D, Christian Rouet, worked on the software engineering side.
        - Introduced ILM's proprietary software, *caricature*, for facial animation. Developed by Cary Phillips, *caricature* allowed artists to preview soft shaded surfaces, including shape deformations, in real time on high resolution geometry. Prior to the use of caricature, artists had to generate the effects of geometric transformations as frame-by-frame as off-line processes. Caricature was patented in 1999 and Cary Phillips won a Technical Achievement Award from the Academy of Motion Picture Arts and Sciences.
    - My contributions:
        - Reported to: CG Supervisors Jim Mitchell, Carl Frederick, Ellen Poon, and Doug Smythe.
        - Primary and secondary enveloping (deformations) as well as socking for the zebra, monkeys, and lion.
        - Shape animation for movement of the lion's musculature.
        - Rendering and compositing for several mosquito and tornado shots.
5. ***Supercuts Stylin***. Live action 30-second commercial broadcast in 1995. Directed by Steve Beck. Client: J. Walter Thompson for Supercuts. Visual effects by Industrial Light & Magic.

- Awards and Recognitions:
  - Won a 1995 Clio Certificate Award
- My contributions:
  - Reported to: Steve Beck, Director.
  - Responsible for setting up the deformations on CG hair stylist's scissors that danced like ballerinas.