

# Curriculum Vitae - Mike Boers

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## EDUCATION and EMPLOYMENT

- Nov. 2013 to Nov. 2014 **Digital Negative Pipeline Consultant** at Fluent Image. *Worked towards moving from offering a feature film image pipeline as a service to offering it as a product. Designed an execution environment for each show to inherit from and extend the core pipeline. Built a general model to represent all the complexity of a VFX heavy feature film. Solved show-stopping and/or day-to-day digital negative related production problems.*
- April 2014 to June 2014 **VFX Pipeline Consultant** at Western Post.
- July 2012 to April 2013 **VFX Pipeline Technical Director** at Western Post. *Overhauled the execution environment, and instigated testing, documentation, and code release procedures. Integrated Shotgun directly into the pipeline, including automatic dependency tracking, streamlining communication between departments. Provided technical assistance to artists.*
- May 2011 to Jan. 2013 **Research Assistant** in PSM/Imager lab at UBC for Dr. Wolfgang Heidrich (to Oct 2011) and Dr. Alla Sheffer. *Developed software to accurately or aesthetically (depending on the project) render novel datasets, including multi-spectra data and normal field representations of objects.*
- Sept. 2011 to Dec. 2011 **Teaching Assistant** for CS314 "Computer Graphics: Rendering" at UBC. *Developed practical assignments and directed labs, focussing primarily on the OpenGL pipeline, but also covering the basics of raytracing.*
- Sept. 2011 Accepted to **MSc. Graduate Program** in Computer Science at UBC.
- Oct. 2010 to March 2011 **VFX Technical Director** and **VFX Software Developer** at Spin VFX. *Developed lighting and rendering software (e.g. shaders, plugins for Maya and RenderMan, etc.), while offering expert technical direction primarily to lighters to devise methods to achieve their aesthetic goals, but also crowd sim, effects, and compositors.*
- Jan. 2010 to present **Freelance VFX Supervisor, Technical Director, Developer, and Artist.** *Offering a full gamut of VFX services from pre-production through to post-production to independent short films.*
- Aug. 2008 to Jan. 2010 **VFX Research and Development, VFX Artist** at Pix Ray VFX. *Developed lighting and rendering software (e.g. shaders, plugins for Houdini and RenderMan, etc.), focussing primarily on volume rendering and efficient generation of massive amounts of geometry at render-time.*
- July 2008 to Aug. 2008 **Intern; VFX Research and Development, VFX Artist** at Pix Ray VFX. *Developed render efficient crowd simulation software, while matte painting and compositing.*
- 2005 to present **Freelance Cinematographer** and **Editor.**
- 2004 to 2008 **HBFA in Film Production** at York University.
- 2004 to present **Freelance Photographer.**
- 2002 to present **Freelance Web Developer.**

## SCHOLARSHIPS and AWARDS

- “Audience Choice Award”** for “Blind Spot” from Mississauga Indie Film Festival, 2012.
- Graduate Teaching Assistant Award** from UBC Computer Science department, 2011.
- Silver “Audience Choice Award”, “Best Canadian Short Film”** for “Blind Spot” from Toronto After Dark Film Festival, 2011.
- “Best Editing”** award for “Outpost 62” from Cinesiege, 2008.
- Entrance Scholarship** of \$4000 from York University, Sept. 2004.
- Marion Drysdale Award** in “French or English video/audio/animation” category for “Reciprocation” from the Ontario Secondary School Teachers' Federation, 2003.

## RECENT FILMOGRAPHY

- Digital Negative Pipeline Consultant** - “Exodus” produced by Fox. In post-production. 2014.
- VFX Supervisor & Producer** - “Shadows in the Grass” by Matthew Nayman and Mike Boers. In post-production. 2013-2014.
- VFX Consultant** - “Splinter” produced by James Mark and Byron Wong. In pre-production. 2014.
- VFX Artist** - “The Substitute” produced by Booruffle Films. 2014.
- VFX Pipeline Technical Director** - “Russell Mania” produced by Keystone Entertainment. 2014.
- Digital Negative Pipeline Consultant** - “Godzilla” produced by Legendary Pictures. 2013-2014.
- VFX Supervisor and Producer** - “Shadows in the Grass” by Matthew Nayman and Mike Boers. 2014.
- Digital Negative Pipeline Consultant** - “X-Men: Days of Future Past” produced by Fox. 2013-2014.
- VFX Consultant** - “Emily” by Joshua Demers. 2014.
- Crowd-Funding Engineer** - “The Secret Trial 5” by Amar Wala. 2010-2014.
- VFX Pipeline Technical Director** - “Super Buddies” produced by Keystone Entertainment. 2013.
- VFX Consultant** - “Laughing Out Loud” by Dan Clements. 2012.
- VFX Lighting Technical Director** - “The Borgias” (episodes 4-9) produced by Showtime. 2011.
- VFX Software Developer** - “The Borgias” (episodes 2-7) produced by Showtime. 2011.
- VFX Supervisor and Producer** - “Blindspot” by Matthew Nayman and Mike Boers. Official selection at 2012 Miami International Film Festival, 2012 London Sci-Fi Film Festival, 2012 Boston Sci-Fi Film Festival, 2012 Mississauga Indie Film Festival, 2012 Toronto Indie Film Festival, 2011 Leeds International Film Festival, 2011 Austin International Film Festival, and 2011 Toronto After Dark Film Festival. 2010.
- VFX Supervisor** - “Edward” produced by Major St. Productions. 2010.
- VFX Artist and VFX Software Developer** - “Asteroid Impact” produced by BBC. 2009.
- VFX Artist and VFX Software Developer** - “Mayday” (season 8) produced by Cineflix. 43 min per episode. 2009.
- VFX Artist** - “Vote 08” US Presidential Election commercial bumpers, produced by ABC. 2008.
- VFX Artist and VFX Software Developer** - “Mayday” (season 7) produced by Cineflix. 43 min per episode. 2008.

## SELECT FILM/GRAPHICS SOFTWARE PROJECTS

- fimodel**, for Fluent Image. A representation of footage transformations as a DAG of non-linear edits, and tools for working with it. Designed for efficient representation of stereo, colour transforms, audio/video sync, timing anomalies, and arbitrary time-based metadata. 2014.
- ARI Despeckle**, for Fluent Image. Tools for interpreting raw ARI files, performing various signal analysis, reconstructing per-frame errors introduced by a broken ARRI sensor, and finally rebuilding raw ARI files to re-introduce into the standard processing pipeline. 2014.
- PyAV**, personal project. Pythonic wrapper around the (often conflicting) FFmpeg/Libav projects, with an active community of committers to manage. Designed for efficiency while heavily simplifying the inherent complexity of the interface. <https://github.com/mikeboers/PyAV>. 2012-present.
- Structured Light Scanner**, personal project. A 3d scanner built from a projector, two video cameras, and custom software using OpenCV and OpenGL. Used for face and full-body scans of actress for relighting in a short film. 2014.
- RVTools**, for Fluent Image. Tools for reading/writing Tweak Software's RV's GTO file format, and abstracting the file model for easy generalization of film/VFX colour pipelines. 2013.
- PyRTX**, personal project. Proof of concept of embedding a CPython interpreter into Pixar's RenderMan via a shade-op, allowing for Python as a source for texture data. <http://mikeboers.com/blog/2013/06/08/renderman-textures-from-python>. 2013.
- The Render Log**, personal project. Explorations of rendering, lighting, simulations, and core VFX concepts to get more experience with all parts of the VFX pipeline. <https://github.com/mikeboers/RenderLog>. 2013-present.
- LLCG (Low Level Computer Graphics)**, personal project. The cross-language libraries that power *The Render Log*, including linear algebra, space subdivision algorithms, shade-ops, etc.. <https://github.com/mikeboers/lcgc>. 2013-present.
- SGSession**, for WesternX. An abstraction of the Shotgun API providing a local data cache and additional intelligence on top of bare entities, allowing for more rapid tool development. <https://github.com/westernx/sgsession>. 2012.
- SGFS**, for WesternX. A library for linking Shotgun entities to file structures on disk, relieving artists from the responsibility of maintaining a sensible working environment, and allowing for integrating Shotgun into the normal file management workflow of 3rd part applications (e.g. Maya and Nuke). <https://github.com/westernx/sgfs>. 2012.
- SGPublish**, for WesternX. A Python library for creating work exporters, or "publishers", which report the work to Shotgun, and ease the flow of work products (e.g. caches, cameras, renders, etc.) from one VFX department to the next. <https://github.com/westernx/sgpublish>. 2012.
- QBFutures**, for WesternX. An implementation of Python `concurrent.futures`, executing on a Qube-managed render farm. Allows for extremely easy exploitation of farm resources for standard tools development. <https://github.com/westernx/qbfutures>. 2012.
- UIFutures**, for WesternX. An implementation of Python `concurrent.futures`, executing in a background GUI on the user's machine. Allows for extremely easy backgrounding of long tasks that are important to the user. <https://github.com/westernx/uifutures>. 2012.
- MetaTools**, for WesternX. A collection of Python tools to assist in developing code in a very short feedback loop. The most useful parts have been automatically reloading code when changes are detected, and functions to assist in renaming/deprecating functions or entire modules. <https://github.com/westernx/metatools>. 2012.

- Remote Control**, for WesternX. A Python package for embedding a externally accessible REPL into long running processes (e.g. web servers) or GUI processes that have a Python API (e.g. Maya and Nuke). <https://github.com/westernx/remotecontrol>. 2012.
- WesternX Maya Tools**, for WesternX. Part of the collection of tools for developers and tools for artists in a VFX environment. Includes context managers for writing tools, binary file parsers, and UI testing tools for developers, and wrappers around geocaches, fluid time-shifting, and reference edits for artists. <https://github.com/westernx/mayatools>. 2012.
- Course Materials for CS314**, for UBC. A set of programming assignments for the third year “Computer Graphics: Rendering” course offered in the computer science department at UBC, covering the entire OpenGL rendering pipeline, and a near-RenderMan-compliant raytracer. 2011.
- NPR of Normal Fields**, for Dr. Alla Sheffer. A rendering pipeline to generate aesthetically pleasing, non-photorealistic images from a set of bezier boundary curves and a normal field using Gooch-based shading and a novel line hatching approach. <http://crossshade.com/>. 2011.
- Multi-Dimensional-Array Visualizer**, for Dr. Wolfgang Heidrich. A realtime interactive data explorer for multi-spectral (often 16 channels) and multi-dimensional (up to 3 and time) datasets. 2011.
- ID/AO Point Cloud Pipeline**, for Spin VFX. A suite of shaders and tools to, with little effort from the artist, bake a radiosity point cloud, calculate multiple bounces of indirect diffuse and multiple distances of ambient occlusion in a highly parallel manner on a render farm, and finally render the results in a single pass. Months after I left Spin, this toolkit facilitated a single lighter to finish 16 shots for the second season of *The Borgias* in 12 days. 2011.
- MayaMan mm\_magic Fork**, for Spin VFX. A series of patches to the Shading Language generation subsystem including fixing a number of bugs (e.g. improper normal face-forwarding during bump/bake), adding addition surface export functionality (eg. bump influenced incident light export), and other tweaks necessary for seamless integration into Spin’s pipeline. 2010.
- PRMan Bake to AIR Render**, for Spin VFX. A suite of tools to utilize the advanced baking functionality of Pixar PRMan, and to translate resultant bakes (in the form of point clouds) into a form ideal for use in SiTex Graphics AIR. 2010.
- Render-time Instancer**, for Pix Ray VFX. A comprehensive tool for SideFx Houdini that instances points, volumes, blobbies, or geometry archive sequences at render-time in a RenderMan compliant renderer. Instances are positioned according to interpolated point cloud data. Useful for sprays/fluids, flocks/swarms, asteroid fields, foliage, etc.. Designed to minimize memory usage allowing for many times more instances than could be held in memory with a simpler approach. 2008 to 2010.
- Point Based Volumes**, for Pix Ray VFX. A set of RenderMan shadeops implementing a complete and self-contained point cloud query system allowing for access to arbitrary key-value data from the set of points returned from any of several query types (e.g. closest N points, points within X radius, self-described spheres intersecting a given point). 2009.
- Fire and Smoke**, for Pix Ray VFX. A set of RenderMan shaders mimicking pyroclastic smoke and fire, written using my Point Based Volume query engine described above. 2009.
- Crowd Generator**, for Pix Ray VFX. Allows render-time generation of agents in a RenderMan compliant renderer, transitioning through existing animation loops, and driven by arbitrary key/value data attached to a point cloud while using a minimal amount of render-time resources. 2008 to 2009.
- Foliage Generator**, for Pix Ray VFX. Allows render-time generation of large amounts of unique foliage of a variety of types, using minimal render-time resources. Uses L-Systems or assembles instances out of recursively arranged pre-generated geometry. 2009.

- Houdini Fur for AIR**, for Pix Ray VFX. A fur rendering system for a RenderMan compliant renderer using the interface provided by Houdini's existing fur system, including style shaders which mimic those provided by SideFX. 2009.
- AutoSHOP**, for Pix Ray VFX. A RenderMan shading language library and SideFX Houdini SHOP node designed in concert to allow for auto-generation and interpretation of advanced GUI elements (e.g.: gradients, menus, etc.) otherwise unsupported by RSL. 2009.
- Dynamic Volume Regions**, for Pix Ray VFX. A RenderMan procedural which generates the necessary "Volume" primitives to encase a given point cloud. This tool minimizes the rendering of empty space and allows for significant translations of the point data without displaying typical boundary or detail-size artifacts. 2009.
- Houdini Volumes for AIR**, for Pix Ray VFX. A toolkit to translate either voxel based or point based volume data with arbitrary key-value data from Houdini to a RenderMan compliant renderer. 2009.
- pixraylib**, for Pix Ray VFX. A C/Python library which serves as the basis for most projects at Pix Ray. Various classes allow for seamless communication between Houdini nodes and code run in a RenderMan compliant renderer via either the Procedural "RunProgram" call, or a RIB Filter. Also contains implementations of space-subdivision algorithms (ie. KD trees), linear algebra, and various noise functions. 2008 to 2010.
- Raytracer**, personal project. A basic raytracer featuring primitive geometric shapes, several types of lighting (including indirect diffuse and ambient occlusion), and a basic set of surface shaders. 2008.

## SELECT SOFTWARE PROJECTS

- AQue**, for Fluent Image. A server-less distributed work queue. Designed to allow for efficient prioritization of work given dynamic worker constraints, such as available IO bandwidth to source/destination paths which changes depending on the worker's connectivity to the RAID. Provides a drop-in replacement for xargs to ease transition from manual processes. 2014.
- Flask-Lightroom**, personal project. A Lua plugin for Adobe Photoshop Lightroom, and corresponding Flask extension, to allow for easy integration of Lightroom into a custom Python web app. Currently driving the publishing of <http://mikeboers.com/photos>. 2014.
- midx**, for Fluent Image. Short for "mini index", an index of file sequences and general metadata continually updated via Linux/OSX file-system watchers. For simple, efficient search for footage in a petabyte multi-RAID setup. 2014.
- Spoon**, personal project. A Git server for small shared projects, using SSH for push/pull, and a web interface for browsing history and files. <https://github.com/mikeboers/Spoon>. 2013.
- uWiki**, personal project. A micro-wiki for small communities. Uses Markdown for styling, and offers a minimal user account and permission model. <https://github.com/mikeboers/uWiki>. 2013.
- sitertools**, for Western Post and Fluent Image. A Python library for inheritance of virtual environments, designed for implementing a "dev" mode in which developers inherit the production environment behind their development environment. <https://github.com/mikeboers/sitertools>. 2012-2014.
- Flask-ACL**, personal project. Highly configurable authorization via access control lists for Flask. <https://github.com/mikeboers/Flask-ACL>. 2013 to present.
- Haikuize**, personal project. A Python toolkit for extracting Haikus from existing text sources. <https://github.com/mikeboers/haikuize>. 2012.
- PyHaml**, personal project. A Python implementation of Haml (<http://haml-lang.com>). Notable due to its sizable user base that requires significantly more effort towards providing proper support (which is often missing from personal projects). <https://github.com/mikeboers/PyHaml>. 2010 to present.

**PyMemoize**, personal project. A Python library for highly general and configurable memoization of functions and methods. <https://github.com/mikeboers/PyMemoize>. 2010.

**ScoreBee**, personal project. A GUI application for scoring behaviors in digital video, designed borrowing techniques from film editing software allowing for more intuitive use than available existing products. Originally written for development on:

*Stemberger T.L.M., Fitzpatrick M.J., Food fights: evidence of a conditional strategy in adult Drosophila simulans males as a result of larval nutrition. (in preparation)*

<https://github.com/mikeboers/ScoreBee>. 2010.

**Flask-Images**, personal project. On-demand image resizing/processing for Flask. Useful for rapid development of retina-aware web layouts.

<https://github.com/mikeboers/flask-images>. 2009 to present.

**PyTomCrypt**, personal project. Python wrapper around the LibTomCrypt cryptography library. Created as existing packages did not present an idiomatic API. Used by an *Activision Blizzard* online service supporting 250 million gamers. <https://github.com/mikeboers/PyTomCrypt>. 2009 to present.

There are several more open source software projects that I either started or contribute to hosted at <https://github.com/mikeboers> and <https://github.com/westernx>

## OTHER SELECT PROJECTS

<http://mikeboers.com>, personal project. A complete blogging engine (including remote media from Twitter, Flickr, Reddit, StackExchange, Vimeo, etc.), a photo gallery with an API for Adobe Lightroom, an endpoint for QR-code based business cards, and a distribution center for client's files. 2011 to present.

<http://secrettrial5.com>, for Amar Wala and Noah Bingham. Successfully crowd-funded a feature length documentary. Featuring donation collection built on top of PayPal, and client editability with varying permissions on different administrators (e.g. the editor may only post to the blog, not deal with donations). 2010 to present.

<http://msgonce.com>, one-day personal project with Shane Martin. A web service to assist in discreet and anonymous transfer of information between parties on the internet. Closed in 2013. 2009.

**The Shutterbug** and/or **Photo 365**, personal project. I attempted to post a new photograph that I captured and processed to my website every day. Intermittently from June 2005 to present.

<http://mikeboers.com/photos>

## SELECT EXTRA-CURRICULARS

Oct. 2014 - **Participated in picoCTF 2014** by Carnegie Mellon University.

Aug. 2014 to present - **Founding member of [The Pseudo Lab](#)**.

Jan. 2014 - **Participated in "MicroCorruption" Embedded Security CTF** by Square.

April 2013 - **Participated in Coursera online education**, including:

- "[Computational Photography](#)", offered by [Georgia Institute of Technology](#)
- "[Cryptography I](#)", offered by [Stanford University](#)

Aug. 2012 - **Attended full "SIGGRAPH 2012" conference** in Los Angeles.

Mar. 2012 - **Participated in the IO wargame** by SmashTheStack. <http://io.smashthestack.org/>

Feb. 2012 - **Participated in Stripe's CTF**. <https://stripe.com/blog/capture-the-flag>

Aug. 2011 - **Attended full "SIGGRAPH 2011" conference** in Vancouver.



Sep. 2009 to present - **Active contributor on GitHub** <https://github.com/mikeboers>

Feb. 2009 to present - **Active contributor on StackOverflow** (and StackExchange family).  
<https://stackoverflow.com/users/25764/mike-boers>

Oct. 2008 to July 2010 - **Participated in several “Technical Evenings”** hosted by SideFX, including (but not limited to): “FLIP Fluids”, “Distributed Fluid Simulations”, “PyroFX”, “Crumpling and Tearing”, “In-Depth Look At Fur”, “Advanced Tool Building”, “On Fire”, “Rendering With Mantra”.

2008 to present - **Level 2 on Project Euler**.

## SUMMARY of KEY SKILLS and AREAS OF FOCUS

- Experience as an artist with much of the VFX pipeline, including: modeling, texturing, lighting, rendering, compositing, match moving, motion tracking, chroma-keying, and matte painting.
- Experience as on-set visual effects supervisor and DIT for independent short films.
- Experience as first and second editor on a variety of dramatic, comedic, documentary, corporate, and experimental films.
- Experience managing active open-source communities with several committers, and moderate production user bases.
- Experience as an artist with SideFX Houdini, Autodesk Maya, Pixar PRMan, SiteX Graphics AIR, DNS Research 3Delight, Animal Logic MayaMan, Foundry Nuke, eyeon Fusion, Adobe After Effects, Pixel Farm PFTrack, Imagineer Systems Mocha, Adobe Photoshop, Maxon Cinema 4D.
- Experience developing a VFX pipeline, collecting and designing requirements, developing tools (many integrating with the Shotgun API), and training artists with their use.
- Knowledge and experience developing software to integrate with or extend RenderMan compliant renderers (e.g.: shadeops, RiFilters, procedurals, etc.), SideFX’s Houdini, Autodesk’s Maya (e.g. plugins, Qt-based and stand-alone tools), Animal Logic’s MayaMan, The Foundry’s Nuke, Tweak Software’s RV, etc..
- Knowledge and experience developing varied shaders for RenderMan compliant renderers, SideFX Houdini (i.e. mantra), Autodesk’s mental ray, OpenGL, and several proprietary renderers.
- Experience working with and developing against 3D scene interchange formats, such as Collada, Filmbox, Alembic, and proprietary and/or ad-hoc.
- Understanding of many of the algorithms and technologies behind the rendering pipeline, both offline (e.g. REYES/rasterization, raytracing) and realtime (e.g. OpenGL rasterization, deferred shading).
- Knowledge and experience with software packaging, continuous integration (e.g. via TravisCI), UI unit-testing, and authoring API and end-user documentation.
- Understanding of many technical photographic concepts, encompassing optics, image capture, signal processing, and methods under the umbrella of computational photography.
- Understanding of and experience with many aspects of colour theory and practice, including linear pipelines, CDLs and LUTs, scene vs. display reference, etc..
- Knowledge and experience with exploiting the inner workings of many key image formats, including DPX, EXR, ARI, R3D, etc..
- Understanding of packaging, encoding, and presentation of digital audio and video.
- Knowledge and experience in the theory and practice of software development covering many realms, from dynamically translated and interpreted languages all the way to the bare metal.
- Experience building frameworks for large deployments which require site or show-specific customization (e.g. variants in a general VFX pipeline for a specific show).

- Experience with system administration and devops, managing several fleets of personal or professional servers/workers hosting an array of services, automating via Fabric or Ansible.
- Experience developing and working with distributed work queues.
- Experience with a variety of databases/stores, including SQL-based (PostgreSQL, SQLite, MySQL), NoSQL (Redis), bulk stores (Amazon's S3 and Glacier), and ad-hoc systems storing petabytes.
- Highly proficient with applied mathematics and physics (often as a film major scoring the highest final grade in classes otherwise filled with math or physics majors).
- Knowledge and experience with server side web development (with Python, and PHP).
- Knowledge and experience with the inner workings of the CPython implementation, exercising control over the execution environment, writing extension modules with Cython or directly in C, and embedding CPython into other applications.
- Knowledge and experience with varied cryptographic primitives and open source cryptographically based protocols (e.g., OATH, oauth, openid, SASL, HTTP authentication, GPG, SSH, etc.).
- Responsible research and disclosure of security vulnerabilities in various software products (either in competitions or in the wild), via assembly inspection, binary patching, network interception, etc.
- Discipline in applying highly technical knowledge in such a way that my work exists solely to tell the story and not to be idolized for its own merits.