



Justin Downs
Email info: Justin(at)IEFRD.com
Website: IEFRD.com

Work Application:

Anthroengineering:

Translating theory into practice for social/engineering challenges

Using:

Multi-point business and funding strategies
Technical design for locally sustainable innovation and social restraints
Diverse systems engineering for original platforms
Applied Field research
Specialty fabrication
Gsm networks, hardware/software development and application theory

To create:

Locally sustained social/tech systems that support and are supported by the individual user.

Biography:

Over a fifteen years of experience as a sole proprietor and business owner working globally in technology theory, design/development, prototyping and fabrication from research camps and tools for conservation (Kenya) to large scale public projects (Stockholm, New York, London) and GSM communication networks (Mali).

In addition to hands on shop and field experience a background in theory has been leveraged in creating disruptive business strategies for Ground Lab LLC as well as open hardware development for social change. This critical practice has produced articles for publications like the Huffington Post, Open Source Journal and lectures and teaching workshops for institutions such as WCS (NYC), the Earth Institute at Columbia, EyeBeam (NYC) and Princeton's Mechanical Engineering Department (NJ).

With this experience comes a broad knowledge base and skill set that allows the translation of theory into a developmental process for original projects and technologies.

Justin was Born in Detroit Mich and has been living and working in New York, NY since 1997.

Selected Work History:

Engineering/Fabrication Businesses:

IEF R&D LLC (Innate Engineering and Fabrication R&D) - **Founder: (2012-)**

Providing design, theory, engineering, consultation and fabrication for original problem sets.
Business/project management, budget creation, legal, IP, hardware software development, fabrication.

Ground Lab LLC - **Co-Founder/CTO: (2008-2012)**

Operated as CTO. In charge of Ground Lab's business focus and strategy, technology development, funding, field research and management of everyday operations.
Development of business structure, legal and open source licensing, head project manager, creation of funding structures, project quoting and budgeting, head systems engineer, lead developer and fabricator including embedded hardware design, software, networking and field testing, parts sourcing, vendor relations.

John Henry's Hammer - **Founder Owner: (1998-2008)**

Providing design theory, engineering, fabrication and consultation for original problem sets.
Business management, project management, budget creation, legal, hardware software development, specialty fabrication, construction, general contractor, electrical, welding ect.

Past Partners/Clients/Collaborators:

UNICEF/UN (Uganda), Columbia University Modi Research Lab (Mali, India), Lion Guardians (Kenya), Wildlife Conservation Society, Princeton Mechanical Engineering, David Byrne (New York, London, Stockholm, Minneapolis), the Starn Twins (Stockholm, Pittsburgh, Cincinnati) Tony Oursler, Urbanscale, Indianapolis Zoo, Thinc Design, Sobi Bicycle, Earth Spark (Haiti), Transformazium, ITP, Arduino, Clockwork Apple, BEAM center, Brooklyn International High school, Cyclopedia, Grid Alternatives (Nicaragua), Responcycle (NYC), Organizmo (Columbia).

Education:

126 hour Advanced Photovoltaics/ Center for Sustainable Energy BCC / Bronx NY / 2014
NIMS CNC Mill Lathe Certification/ Advanced Manufacturing Suffolk Suny / Suffolk, NY / 2013
MPS (computer science) / Interactive Telecommunications Program/ NYU / New York, NY / 2009
DOT AWS Certification / Modern Welding School / Schenectady, NY / 2006
BFA / Fine Art & Semiotics / School of Visual Arts / New York, NY / 2002

Certifications:

Programing:

New York University (NYU) School of Continuing & Professional Studies

- Professional Certificate **C++ Programing**

Welding:

Department of Transportation New York State (NYSDOT) Certification:

- **Shielded Metal Arc Weld (SMAW) vertical** position 1/8th" to unlimited.

American Welding Society (AWS) Certifications:

- **GTAW (Gas tungsten arc weld) vertical** position.
- **SMAW (Shielded metal arc weld) vertical and overhead** positions, 1/8th" to unlimited.
- **FCAW (Flux core arc weld) vertical and overhead** positions, 1/8th" to unlimited.

American Society of Mechanical Engineers (ASME) Certification

- **6G Schedule 40 pipe** with E6010 root, E7018 cover pass

Machining:

National Institute for Metalworking standard (NIMS)

- CNC Milling Operator Machining Level 1 Standard
- CNC Lathe Operator Machining Level 1 Standard

Safety:

OSHA

- OSHA 10 Hour Construction
- GHS and OSHA Hazardous Communication

Solar:

NABCEP – **NABCEP Certified PV Installation Professional**

Center for Sustainable Energy at Bronx Community College

- 36-hour Math/Electricity Basics for Photovoltaics
- 40-hour Introductory Photovoltaic Design and Installation
- 40-hour Advanced Photovoltaics: Grid-Tied

Grants/Personal Projects/Awards (Selected):

Grant:

NYSCA

GRANT "Electronic Media & Film" (2008)

Awards:

Maker Faire NY, *Editor's Choice Award* (2010)

Projects:

Organizmo (Bogotá, Colombia) "Sonic Prism" (2016)

Free 103 point 9's Wave Farm "Will O the Wisps" (2010)

Interactivos at Eyebeam "Watch what you are" (2008)

Group show "Visionary Architecture" dia beacon (2009)

D.U.M.B.O Arts festival "The Living Room" Brooklyn New York (2002)

Panels / Lectures / Workshops:

- (2015) Lecture Queens college "Anthroengineering: Translating theory into practice for social/engineering challenges"
- (2012) Panel 4th Annual Entrepreneurship Day / Rutgers University: "Innovation for Life" with Steve Wozniak.
Workshop Princeton Mechanical engineering department: GSM networking
Demo/Presentation Maker Faire
- (2011) Panel 3th Annual Entrepreneurship Day / Rutgers University: "Support Services and Funding Social Entrepreneurship Projects."
Lecture Maker fair: "Open Source and small business Ground Lab"
Demo/Presentation Maker Faire
Lecture Columbia University "Sustainable solutions and M2M"
Keynote Speaker Open Hardware Summit: "Labor over Capital: how open development sustains small business and drives innovation." <http://2011.oshwa.org/files/2011/09/OHS_presentation_final.pdf>
- (2010) Lecture Wildlife Conservation Society (2010) "Open Conservation"
<<http://www.slideshare.net/grndlab/ground-lab-presentation-at-wcs>>
- (2008) Lecture Double Take, EyeBeam (2008)
- (2007) Lecture The Personal Range Finder / Avelient BioPharm group (2007)

Essays/Publications:

Research and Development Theory:

Downs, Justin. "Knowledge Never Goes Out of Style: Resources and Research to Build New Old Technology." *The Huffington Post*. TheHuffingtonPost.com, 22 June 2011. Web. 08 July 2012.

<<http://www.huffingtonpost.com/the-new-york-public-library/knowledge-never-goes-out-b-882232.html>>.

Downs, Justin. "Tools of the Trade: Justin Downs on "Playing the Building"" *Rhizome*, 13 Aug. 2008. Web. 08 July 2012. <<http://rhizome.org/editorial/2008/aug/13/tools-of-the-trade-justin-downs-on-playing-the-building/>>.

Downs, Justin. "New ER&D for social Markets" *Telit2market, Issue 07*, April 2012. Telit, July 2012. Web. 08 July 2012.
<http://www.telit.com/ebook/telit2market_2012_opf_files/WebSearch/page0056.html>.

Downs, Justin. "Some Thinking about Economy", Justin Downs." *Transformazium*. 30 Jan. 2011. Web. 08 July 2012. <<http://www.transformazium.org/log/2011/01/some-thinking-about-economy-by-our-frequent-collaborator-justin-downs/>>.

Open Source and Conservation:

Downs, Justin. "GROUND LAB Part 1: Practical Prototyping and the History of Technological Development." *Open Source Beyond Technology*. *Opensource.com*, 16 Sept. 2010. Web. 08 July 2012.
<<http://opensource.com/business/10/9/ground-lab-part-1-practical-prototyping-and-history-technological-development>>.

Downs, Justin. "GROUND LAB Part 2: Open Source and the Manufacturing Shift." *Open Source Beyond Technology*. *Opensource.com*, 23 Sept. 2010. Web. 08 July 2012.
<<http://opensource.com/life/10/9/ground-lab-part-2-open-source-and-manufacturing-shift>>.

Downs, Justin. "GROUND LAB Part 3: How Open Source Objectively Affected Our Development Process." *Open Source Beyond Technology*. *Opensource.com*, 7 Jan. 2011. Web. 08 July 2012.
<<http://opensource.com/business/10/9/ground-lab-part-3-how-open-source-objectively-affected-our-development-process>>.

Press:

Open Source and Conservation:

Kerr, Millie "Lion Facial-Recognition Debuts in Africa" *Scientific American* Jun 16, 2015
<<http://www.scientificamerican.com/article/lion-facial-recognition-debuts-in-africa/>>

Simonite, Tom. "SMS Data Link Keeps Tabs on the Lions." *Technology Review*. MIT, 23 Nov. 2011. Web. 08 July 2012. <<http://m.technologyreview.com/communications/39175/>>.

Mann, Ted. "Now Even Lions Are Sending Texts." *The Atlantic Wire*. N.p., 17 Dec. 2011. Web. 08 July 2012. <<http://www.theatlanticwire.com/technology/2011/12/now-lions-are-texting-each-other/46344/>>.

Nerenberg, Jenara. "Designers Craft Collars to Tame Lions, Costs." *FastCompany.com* .N.p., 11 Feb. 2011. Web. 08 July 2012. <<http://www.fastcompany.com/1723975/sustainable-designers-find-their-way-to-africa-with-gps-collars>>.

Leibach, Julie. "Open Source Wildlife Conservation: Tracking Lions (and Cows)." *Audubon Magazine*, 31 Jan. 2011. Web. 08 July 2012. <<http://magblog.audubon.org/open-source-wildlife-conservation-tracking-lions-and-cows>>.

Benenson, Fred. "Open Source Follow Through"
Kickstarter, 28 July 2011. Web. 08 July 2012. <<http://www.kickstarter.com/blog/open-source-follow-through>>.

Research and Development:

"Telit M2m Modules Empower Ground Lab's 'smart' Social Responsibility." *Telit Media Center*. Telit Wireless Solutions, 10 Nov. 2011. Web. 08 July 2012. <http://www.telit.com/en/discover/telit-media-center/press-releases.php?p_id=283>.

"M2M Powers 'Smart' Citizenship." *Connected World Magazine*. N.p., 10 Oct. 2011. Web. 08 July 2012. <<http://www.connectedworldmag.com/latestNews.aspx?id=NEWS111010123404303>>.

Cunningham, Colin. "Sola-System." *Make Magazine*. 13 May 2008. Web. 08 July 2012.

Play the Building:

Jessi Lehman "Playing the Building at Aria" *Ampers 10,000 Fresh Voices* *KFAI* November 2012 (*RADIO Broadcast*)

Kennedy, Randy. "David Byrne's New Band, With Architectural Solos." *The New York Times*. The New York Times, 30 May 2008. Web. 08 July 2012.
<<http://www.nytimes.com/2008/05/30/arts/music/30byrn.html?pagewanted=all>>.

Ogando, Joseph. "Actuators Strike A Musical Note." *Design News*. N.p., 2 June 2008. Web. 08 July 2012. <http://www.designnews.com/document.asp?doc_id=227683>.

Work History:

Past partners/clients/collaborators

UNICEF/UN (Uganda), Columbia University Modi Research Lab (Mali, India), Lion Guardians (Kenya), Wildlife Conservation Society, Princeton Mechanical Engineering, David Byrne (New York, London, Stockholm, Minneapolis), the Starn Twins (Stockholm, Pittsburgh, Cincinnati) Tony Oursler, Urbanscale, Indianapolis Zoo, Thinc Design, Sobi Bicycle, Earth Spark (Haiti), Transformazium, ITP, Arduino, Clockwork Apple, BEAM center, Brooklyn International High school, Eyebeam, The Wave Farm, Grid Alternatives (Nicaragua), Responcecycle, Organizmo (Columbia)..

Work positions and associated projects:

IEF R&D LLC (Innate Engineering and Fabrication R&D) Founder: (2012-)

Sole-Proprietorship providing design, theory, engineering, consultation and fabrication for original problem sets. *Including:* Business management, project management, budget creation, legal, IP, hardware software development, fabrication etc.

Associated projects:

Grid Alternatives – SYSTEMS ENGINEER for the Nicaragua office. Responsible for microgrid design, drip irrigation design and installation, off grid design and installation for clinics, schools, and rural towns. Also responsible for teaching and training the local engineers in system design and NEC code. (2016-2017)

ResponceCycle – Engineering Design and fabrication of a 2 ton automated composting system, consulting strategy for business development. (2016)

Lion Guardians - Project Director and Systems engineer for LINC: a lion database and computer vision facial recognition system for identifying lions in East Africa.(2015)

Grid Alternatives - Team leader and construction consultant for residential solar installations. (2015)

American Academy of Pediatrics Chapter 3 – Web site redesign: information structure and code base.

Lion Guardians - Off grid Solar repair Kenyan research camp. (2014)

Brooklyn International High School/ BEAM center – Designed the curriculum for and taught the flagship Electronics and Solar Technology class as well as Programming in Processing. (2014)

Brooklyn International High School/ BEAM center – Consulting and design of maker lab. Hackerspace design theory, Electrical design, CAD drafting and technology specifications. (2014)

Clockwork Apple – Specialty aluminum welding, machining, CNC operation. (2014)

WGXC Community radio – Html 5 canvas based listener map infographic. (2013)

Sobi bicycles - Embedded software development for GSM Library/connectivity. (2012)

Starn Twins - Carbon Arc lamp (Cincinnati) Engineering systems design/Fabrication. (2012)

David Byrne - Playing the Building (Minneapolis) Engineering systems design/Fabrication. (2012)

Earth Spark – Panel fabrication for remote PV system. (2012)

Ground Lab LLC Founder/CTO: (2008-2012)

Operated as CTO. In charge of Ground Lab's business focus and strategy, technology development, funding, field research and management of everyday operations.

Including: Development of business structure, legal and open source licensing, head project manager, creation of funding structures, project quoting and budgeting, head systems engineer for all projects, lead developer and fabricator for all projects including embedded hardware design, software, networking and field testing, parts sourcing, vendor relations.

Associated projects:

Open M2M project - Developed open source hardware and code for GSM/GPS tracking and communication hardware. (2008-12)

Indianapolis Zoo/Thinc design - Engineering, design and fabrication of original interactive devices for primates (orangutans) . (2011)

Urbanscale farevalue - Systems engineer for farevalue, hardware/software design for E-ink module of

farevalue. (2011)

Sobi bicycles - Engineering of dynamo battery charging circuit. (2010)

Modi Lab @ Columbia University, Shared Solar – Design, Engineering and fabrication of GSM hardware for network connectivity of a micro grid solar system. (2010-2011)

Tony Oursler – Engineered and fabricated aluminum “Splat” works (2010)

Lion Guardians – Engineering design and construction of remote research camp in Kenya. (2009)

Lion Guardians, Living with Lions -Engineering design and installation of research camps remote solar power system. (2009)

Unicef device X - Head systems engineer, design and GSM functionality for a M-health diagnostic device. (2008)

John Henry's Hammer Founder/Owner: (1998-2008)

Sole-Proprietorship providing design theory, engineering, fabrication and consultation for original problem sets.

Including:

Business management, project management, budget creation, legal, hardware software development, specialty fabrication, construction, general contractor, electrical, welding ect. (1998-2008)

Associated projects and work:

Transformazium:Design consultant/backend web programming (2007-2008)

Transformazium:Engineering consultant/work for deconstruction/demo of Transformazium parish house (2007-2009)

Starn Twins: arc lamp (Pittsburgh) (2008)

David Byrne: Playing the Building (Engineering systems (2008)
design/Fabrication)

Plum Design group: consultation on interactive information Kiosk (2007)

Big Ripple Multimedia: systems design/engineering and hardware development (2007)

Amorphic Robot Works: A tree for anable basin (Engineering design/Fabrication/aluminum welding) (2007)

Amorphic Robot Works: Design/Engineering consultant (inflatables) (2007)

David Byrne: Playing the Building (Engineering systems (2005)
design/Fabrication)

Starn Twins: Design/Fabrication and Production Management for the projects: Attracted To Light: CRT sphere, The Carbon arc lamp. Wall mounts for the Umbraterre series. Maintenance/repair/redesign for: Gravity of Light: Gravity of light and the illuminated manuscript. Engineering consultation and fabrication for prototype cover of the Monacelli Press book. (2002-2005)

Luca Bovoli: (technical consultation/fabrication) Flying: Practical Training for Beginners, Various works (2001,2003-2004)

Jeane Silverthorne: Fabrication of New Work 2004 (2004)

Rene Pierre Allain Welding studio: Fabrication for the Darger exhibition at the New York folk museum. (2001-2002)

Non Profit/Volunteer work:

Cyclopedia bicycle program (2012-):

Co director New York Chapter, Program strategy, volunteer manager, ride leader, bicycle mechanic.

W-2 work:

Spokes and strings (NYC Bikes) (2004):

General repair/ bicycle mechanic

Zynok Construction (2001-2003):

Drywall, finishwork, stainless steel welding

School of visual arts (2000-2002):

Head of the foundations shop – technician/safety instructor

Teaching assistant for foundation sculpture class

Skills and Tools:

<p>Engineering theory/Social Design:</p> <ul style="list-style-type: none"> • Social practice in technology • Diverse materials experience (Blue Gum to Stainless steel) • Diverse field experience/research (Primates to visual perception) • Open source business modeling 	<p>Platforms/Tools: Contract models for Open source software and hardware, Collaborative design and community building, Workshops, Panel discussions and Qualitative Studies of Communities for technology feasibility.</p>
<p>Business/Management:</p> <ul style="list-style-type: none"> • Small business management and accounting • Project/budget management • Supply chain management • Non traditional fund raising • Open source IP contract creation • Grant writing 	<p>Platforms/Tools: GNUCash, LibreOffice, Open office, Microsoft Word/Excel, Git, GitHub, Wiki, phpbbb, Doku wiki, Mailchimp, Crowd funding platforms (Kickstarter, IOBY) etc.</p>
<p>Hardware/Electronics:</p> <ul style="list-style-type: none"> • Embedded development • Analogue sensor integration • GSM/mesh networks • Motor control • U/I devices • Circuit design • PCB Layout and Design (RF noise reduction techniques) 	<p>Platforms/Tools: AVR, RF(xbee), bluetooth, Cell/GSM modules, Embedded Linux, Eagle CAD, gEDA tools, Surface mounting.</p>
<p>Programing:</p> <ul style="list-style-type: none"> • Embedded programing • U/I • Vision Tracking • Web visualization • Informatics tracking visualizations 	<p>Platforms/Tools/Languages: C , C++ , Assembly for RISC AVR instruction set, Java , PHP/MYSQL , Python, Bash scripting, basic embedded Linux, Make/makefiles, GCC compiler suite, GDB.</p> <p>Operating systems: Linux, Unix, Android, Angstrom, Debian, Fedora, basic widows scripting</p> <p>IDE's/API: Arduino, Processing, Processing JS, Open Frameworks, OpenCV, maxMSP/jitter, Vim, Eclipse, codeBlocks, OpenGL.</p>
<p>Industrial Design:</p> <ul style="list-style-type: none"> • CAD design • BOMs • Electrical schematics/Architectural diagrams • Graphic design 	<p>Platforms/Tools: LibreCad, Solidworks, LibreOffice ODF drawing, Google Sketchup, GIMP, Photoshop, Illustrator, Power Point.</p>

Fabrication, General Contracting	
Electrical (Kali Mawire): <ul style="list-style-type: none"> • Household and high voltage • KVA transformers • Large DC power sources • Cooling systems for large KVA devices • Remote solar 	Tools/Platforms: Multimeter
Metal/Welding/Machining : <ul style="list-style-type: none"> • Blueprint/welding spec reading • Fabrication (drill press, grinder, ect.), • Finish work • Machining with DRO • mill work manual and CNC Fanuc control • Lathe operation manual and CNC Fanuc control • Basic G-code programming 	Tools/Platforms: Q-Cad, EMC2 CAM, G-code, Librecad, HAAS, FANUC, LinuxCNC, Mach 3, hsmworks.
Welding Certified welder (D.O.T, AWS): <ul style="list-style-type: none"> • Structural and general fabrication. • Mig, • Tig, • Arc (stick), • oxy acetylene 	Metals: steel, aluminum, cast iron brazing copper/brass, stainless steel. Aluminum: HF and thin guage.
Wood/Carpentry: <ul style="list-style-type: none"> • Wood shop • Framing • Drywall • Construction 	Table saw, chop saw, planer, router, sanding, biscuit joining, structural joining, chainsaw rough cut work.
Rigging: <ul style="list-style-type: none"> • Forklift operation/maintenance • Free rigging harness work 	80' ART MANLIFT W/JIB (multi-articulate cherry picker), 50' Scissor lift, 2 ton winch.
Pneumatics: <ul style="list-style-type: none"> • General pneumatics and process control. 	General pneumatic troubleshooting and maintenance.