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# JUSTIN PATRICK MCKAY, E.I.T.

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## Mechanical Engineer, EIT

Bachelor of Science; Mechanical Engineering

*The University of Texas at Austin, May 2010*

<http://www.me.utexas.edu/>

Business Minor, McCombs School of Business

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## Professional Experience

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Mar 2015 - Feb 2016

### Mechanical Engineer

*Southwest Signs, Inc.*

Served as a Mechanical Engineer in a high-volume sign manufacturing facility designing commercial signage for some of the most recognizable corporations in the United States seeking to establish their presence when breaking ground on a new storefront location. In addition to mechanical design using SolidWorks, I was specifically hired to incorporate my knowledge and expertise in manufacturing to establish a more proficient, technically robust design and engineering department. Such refinements included the standardization of part numbering schemes, the establishment of quality design practices and techniques, and the development of SOPs and Design Standards to streamline the flow of information from our sales department through engineering and on to the production team and manufacturing facility to cut costs and more efficiently meet the timely demands of our customers

Oct 2012 - Oct 2014

### Mechanical Engineer

*Active Power*

Led the mechanical design and development of a new product line of standardized Switchboards to be integrated into Active Power's new line of containerized modular power solutions for the large datacenter market. Active Power manufactures flywheel-based uninterruptible-power-supply (UPS) systems for mission critical facilities offering an array of unique backup power solutions tailored to suit the needs of our customers, including Amazon, Yahoo, Hewlett Packard, Google, Microsoft, etc. I designed the line of Switchboards using Solidworks with integrated product data management package Enterprise PDM. In addition to the design and generation of full sets of engineering drawing packages, I oversaw and supported the assembly and manufacture of the company's very first PH480 Powerhouse product working closely with our manufacturing facility and personnel.

Aug 2010 - Oct 2012

### Mechanical Engineer, Lead

*Knight Aerospace*

Designed custom modular and palletized interiors for military cargo aircraft including C130s and C17s. Modeled interior structures in SolidWorks and produce mechanical part detail, assembly, and installation drawings of all parts to be fabricated, assembled, and installed. Generated Bill of Materials (BOMs) for all drawings. Performed computational and hand-calculated stress analyses on structures and installations to ensure structural integrity and compliance with relevant FARs (Federal Aviation Regulations.) Oversaw manufacturing and serve as liaison engineer to the machine shop during production.

Jan 2006 - Jan 2010

### Mechanical Engineering Intern, Lab Technician

*3M Company*

Lead Lab Technician for The Universal Cover Tape Program and Electrostatic Discharge Products Division. Conducted an array of long-term product development studies, experiments, and qualification testing. Documented detailed process, product, and sample observations, noting anomalies. Administered statistical analyses and composed technical briefs to summarize empirical data. Contributed to the Research and Development of a US Patent filed for in 2008.

May 2007 - May 2008

Research Assistant; Automated Design Lab

*The University of Texas, Mechanical Engineering Department*

Contributed to graduate research in Automated Conceptual Design. Developed a computational theory by combining empirical reverse engineering techniques and graph-grammar-based methods to automate conceptual design of electromechanical systems.

May 2005 - Aug 2005

Research Assistant; Texas Petawatt Laser

*The University of Texas, Physics Department*

Contributed to the design and construction of the Texas Center for High Intensity Laser Science as a member of Texas Petawatt Laser Facility, the world's most powerful Laser. Designed and modeled optomechanical components of the Petawatt Laser using SolidWorks. Generated mechanical drawings of models for parts to be fabricated.

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## Academic Experience

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Aug 2008 - Dec 2008

Project Lead

*DELL Inc.*

**Technical Support Facility Design and Implementation**

Designed a free-standing customer service facility for the repair and upgrade of PC's to be installed in commercial electronic retail stores. The facility contained a reception counter for interacting with customers and processing service requests, an operating room for executing the service requests on the given electronics, and ample storage cabinetry for systems awaiting service. Generated CAD models of candidate concept structures using SolidWorks. Optimized floor plan layout to maximize storage capacity while minimizing overall footprint within retail store. Coordinated with various vendors to obtain quotes for fabrication of prototype.

May 2008 - Aug 2008

Project Lead, Senior Design Course

*The University of Texas, Mechanical Engineering Dept.*

**Product Reverse Engineering and Redesign, Cordless Swivel Sweeper**

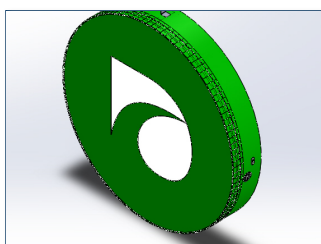
Dissected, reverse engineered, and created CAD model of existing Swivel Sweeper using SolidWorks. Designed a human powered electromechanical power generation and battery recharge system incorporating a DC generator. Built proof-of-concept prototype implementing power generation redesign modification. Awarded Most Innovative Team by professors.

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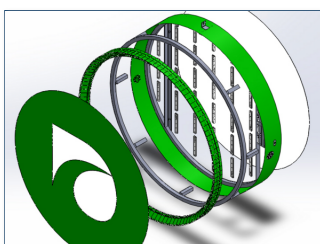
## Portfolio: Southwest Signs

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Served as a Mechanical Engineer in a high-volume sign manufacturing facility designing commercial signage for some of the most recognizable corporations in the United States seeking to establish their presence when breaking ground on a new storefront location. In addition to mechanical design using SolidWorks, I was specifically hired to incorporate my knowledge and expertise in manufacturing to establish a more proficient, technically robust design and engineering department. Such refinements included the standardization of part numbering schemes, the establishment of quality design practices and techniques, and the development of SOPs and Design Standards to streamline the flow of information from our sales department through engineering and on to the production team and manufacturing facility to cut costs and more efficiently meet the timely demands of our customers



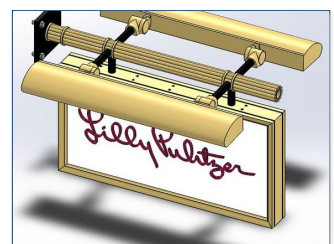
DriveTime Wall Sign



DriveTime, Exploded



Conceptual Rendering for GMI



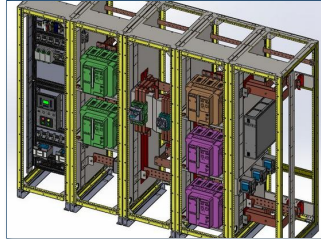
Lilly Pulitzer Cantilever Boti...

## Portfolio: Active Power

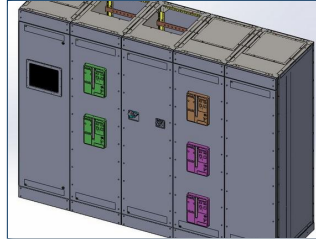
Led the mechanical design and development of a new product line of standardized Switchboards to be integrated into Active Power's new line of containerized modular power solutions for the large datacenter market. Active Power manufactures flywheel-based uninterruptible-power-supply (UPS) systems for mission critical facilities offering an array of unique backup power solutions tailored to suit the needs of our customers, including Amazon, Yahoo, Hewlett Packard, Google, Microsoft, etc. I designed the line of Switchboards using Solidworks with integrated product data management package Enterprise PDM. In addition to the design and generation of full sets of engineering drawing packages, I oversaw and supported the assembly and manufacture of the company's very first PH480 Powerhouse product working closely with our manufacturing facility and personnel.



PowerHouse Modular Infrass...



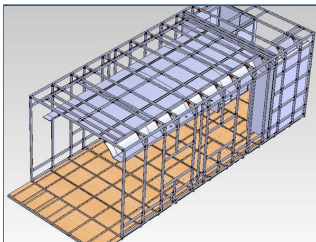
Switchboard Frame



Switchboard

## Portfolio: Knight Aerospace

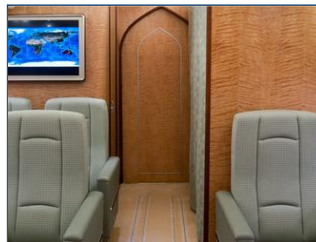
Designed custom modular and palletized interiors for military cargo aircraft including C130s and C17s. Modeled interior structures in SolidWorks and produce mechanical part detail, assembly, and installation drawings of all parts to be fabricated, assembled, and installed. Generated Bill of Materials (BOMs) for all drawings. Performed computational and hand-calculated stress analyses on structures and installations to ensure structural integrity and compliance with relevant FARs (Federal Aviation Regulations.) Oversaw manufacturing and serve as liaison engineer to the machine shop during production.



Custom VVIP Module



Custom VVIP Modular Interi...



Custom VVIP Modular Interi...



Custom VVIP Modular Interi...



6K Engine Hoist Crane, Retrofit



6K Engine Hoist Crane, Retr...

## Portfolio: 3M

- Lead Lab Technician for The Universal Cover Tape Program and Electrostatic Discharge Products Division
- Conducted an array of long-term product development studies, experiments, and qualification testing
- Documented detailed process, product, and sample observations, noting anomalies
- Administered statistical analyses and composed technical briefs to summarize empirical data
- Contributed to the Research and Development of a US Patent filed for in



3M Publication

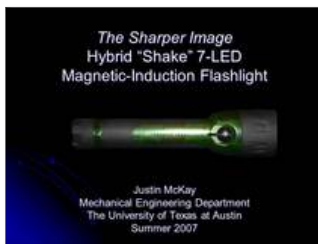


3M, Letter of Commendatio...

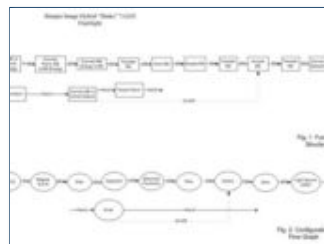


## Portfolio: Automated Design Lab

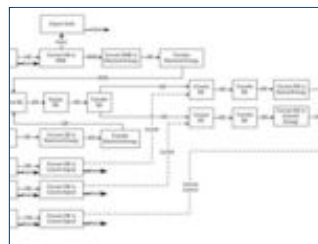
Contributed to graduate research in Automated Conceptual Design. Developed a computational theory by combining empirical reverse engineering techniques and graph-grammar-based methods to automate conceptual design of electromechanical systems.



Sharper Image Faraday Flas...



Sharper Image Faraday Flas...



Free Play Solar and Hand-Cr...



My AD Lab Research, Spring ...

## Portfolio: Texas Petawatt Laser

UT's World-Class Petawatt Laser

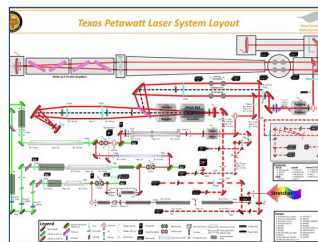
Contributed to the design and construction of the Texas Center for High Intensity Laser Science as a member of Texas Petawatt Laser Facility, the world's most powerful Laser. Designed and modeled optomechanical components of the Petawatt Laser using SolidWorks. Generated mechanical drawings of models for parts to be fabricated.



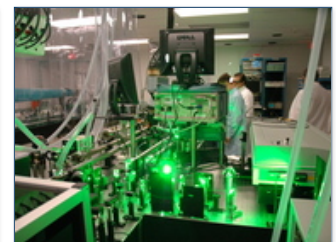
World's Most Powerful Laser



UT Exhibits World-Class Laser



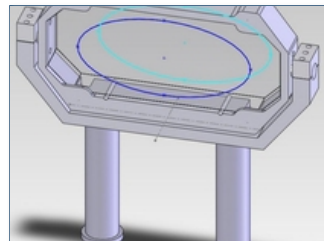
Texas Petawatt Laser System



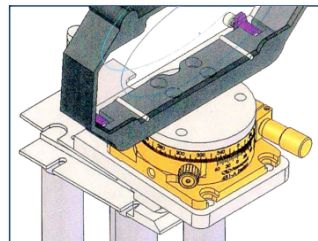
Petawatt Clean Room



Wired.com on The Petawatt



Polarizer Mount



tilt stage assembly

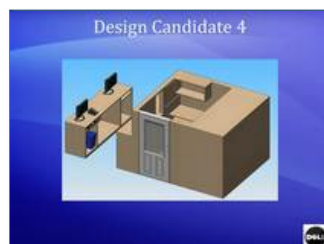
## Portfolio: DELL Senior Design Project

Technical Support Facility Design and Implementation

Designed a free-standing customer service facility for the repair and upgrade of PC's to be installed in commercial electronic retail stores. The facility contained a reception counter for interacting with customers and processing service requests, an operating room for executing the service requests on the given electronics, and ample storage cabinetry for systems awaiting service. Generated CAD models of candidate concept structures using SolidWorks. Optimized floor plan layout to maximize storage capacity while minimizing overall footprint within retail store. Coordinated with various vendors to obtain quotes for fabrication of prototype.



Design Candidate 4, Floorplan



Design Candidate 4.1



Design Candidate 4



Dell, Final Presentation

## Portfolio: Swivel Sweeper: Redesign

Product Reverse Engineering and Redesign, Cordless Swivel Sweeper

Dissected, reverse engineered, and created CAD model of existing Swivel Sweeper using SolidWorks. Designed a human powered electromechanical power generation and battery recharge system incorporating a DC generator. Built proof-of-concept prototype implementing power generation redesign modification. Awarded Most Innovative Team by professors.



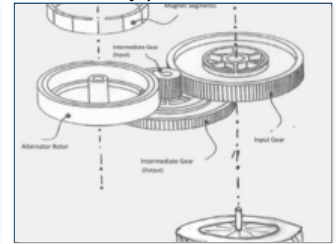
Cordless Swivel Sweeper



Swivel Sweeper, Solidworks ...



Swivel Sweeper, Reverse En...



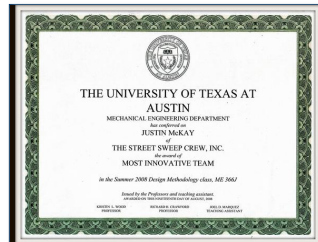
Design Mod, Alternator Asse...

Three-Phase Alternator Optimization									
Constants	Value	Units	Constraints	Calculated	Relation	Unit	Units		
Gen RPM	2000	RPM		2.25		0.075	in		
Gen RPM	2000	RPM		2.25		0.075	in		
Design Variables	Parameter	Units	Conclusions	Variant 1					
	2.25	in							
	7.653982	in							
Objective	Parameter	Units	Results						
	Gen Ratio	8.533493							
Variables	Input	Gen	Output	Go Feasible?					
Variant 1	30	3.85	No						
Variant 2	75	8.77	No						
Variant 3	100	11.69	No						
Variant 4	125	14.61	Yes						
Variant 5	150	17.54	Yes						

Gear Train Optimization



Alternator Mod, Function Str...



Most Innovative Team

## Awards & Achievements

- Certified Engineer-In-Training (E.I.T.), Texas Board of Professional Engineers, 2012
- Eagle Scout, San Antonio, Texas, 2003
- Captain, American Pool Association, Austin League Team, 2007-2009
- AP Scholar, AHHS, 2003
- Participant, American Invitational Mathematics Exam, AHHS, 2002
- Qualifier, American Mathematics Competition 12, AHHS, 2001

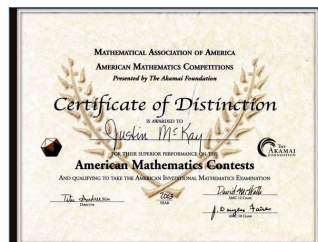
## Awards & Achievements



Certified Engineer-In-Training



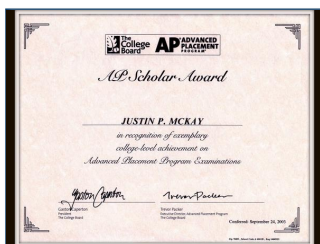
Business Foundations Minor



American Mathematics Com...



American Invitational Mathe...



AP Scholar Award

Jan 2012 - Present

Engineer-in-Training (E.I.T.)  
Texas Board of Professional Engineers  
License #47333

2003 - Present

Eagle Scout  
Boy Scouts of America

2009 - Present

Business Foundations Certification  
The University of Texas, McCombs School of Business

## Scholarships



Baumberger Endowment



Franque and Philip Curtis Sc...



Vordenbaum Scholarship



Anna May Campbell Scholar...

## Skills

Solidworks 3D

AutoCAD

Microsoft Office Suite

Adobe Photoshop

Word, Excel, PowerPoint, Outlook, OneNote, Project,  
Visio

Programming Languages

LabView, Java, MATLAB, C, C++, C#

