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Joe Shields

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Education

- Portland State University, 3.65 GPA **Sep. 2013 – Jun. 2016**
  - **B.S. Mechanical Engineering**, Maseeh College of Engineering and Computer Science
    Focus: heat and mass transfer
  - **B.S. Physics**, College of Liberal Arts and Sciences
    Focus: classical mechanics and electromagnetism

- Portland Community College, 3.0 GPA **Sep. 2008 – Jun. 2010, Sep. 2011 – Sep. 2013**

Employment

- Design Engineer, Earth and Space Institute and AirPhoton **Oct. 2021 – July 2023**
  - Rescued a 20-million-dollar project through the understanding of physical scaling laws
  - Designed orbital, airborne, and ground-based instruments
  - Managed system requirements, interfaces, and performance
  - Worked with contractors, customers, scientists, and engineers to create system specifications
  - Performed space-claim, keep-out-zone, and tolerance analyses
  - Designed cameras and optical calibration systems
  - Solved multi-disciplinary design constraints (mechanical, optical, pneumatic, thermal, etc.)
- Engineer, SpaceX **Mar. 2019 – Sep. 2019**
  - Supported a wide variety of mechanisms on the human-rated Dragon 2 docking systems
  - Wrote detailed and intuitive assembly instructions to meet strict quality standards
  - Owned aggressive build schedules and held others accountable to them
  - Solved issues including design errors, part damage, missing parts, and documentation errors
- R&D Engineer, Pacific Diabetes Technologies **Sep. 2018 – Feb. 2019**
  - Prototyped wearable micro-fluidic devices and electronic enclosures
  - Created designs, models, and drawings for patent applications
  - Designed miniaturized assemblies for 3D printing and injection molding

Volunteering

- Mechanical Lead, PSAS **Dec. 2015 – Mar. 2019, Sep. 2019 – Oct. 2021**
  Created an open-hardware carbon fiber rocket airframe for the Portland State Aerospace Society
  Managed interdisciplinary projects among students and professionals
  Published and presented a conference paper on the project for AIAA SPACE 2016
  Documented design and manufacturing processes to foster institutional knowledge
  Mentored student projects and assembled project teams
  Maintained equipment and lab space
  Designed parts using hand calculations, prototypes, computer models, CFD, and CAD
  Performed FMEA and root-cause analysis
- Design Engineer, OreSat **Jan. 2017 – Mar. 2019**
  Coordinated the design of all mechanical subsystems in Oregon's first satellite
  Maintained the top-level SolidWorks assembly of the satellite
  Incorporated constraints from NASA, NanoRacks, and OreSat electrical subsystems
  Worked across engineering disciplines to resolve highly coupled designs
  Led analysis and design reviews
- Lab Manager, Electronics Prototyping Lab **Jan. 2018 – Mar. 2019, Sep. 2019 – Oct. 2021**
  Maintained equipment and lab space
  Trained students on prototyping equipment
  Ran the lab's parts store

Tools

- 3D printers (FDM, SLA, SLS, MJP), laser cutters, mills, lathes, hand tools
- PCB routers, soldering (hand, re-flow), oscilloscopes, various microscopes
- Composites manufacturing (wet, dry, high/low-temperature), metal working

Software

- R, MATLAB, C++, Python, Bash, Vim, Git, Jekyll, HTML
- Inventor, SolidWorks, NX, Teamcenter, Onshape, Abaqus, AutoCAD, GIMP, Inkscape
- LaTeX, Microsoft Office, Libre Office, Google Docs, et cetera
- Linux, Windows

Small Projects

In addition to the projects below, you can check out the rest of my portfolio at github.com/Joedang.

- iTopie printer
  Modified and built a RepRap 3D printer from parts including a custom laser-cut frame
- Restricted 3-body simulation
  An R script for investigating the motion of satellites within planet-moon systems
- N-body simulation
  Various scenarios involving an arbitrary number of charged massive particles written in MATLAB
- OpenFOAM analysis
  A model of supersonic flow around a rocket nosecone, used to inform the part's design

References

- Supervisors
  - Andrew Greenberg – PSAS director — adg4@pdx.edu
  - J. Vanderlei Martins – principal investigator — 301-828-7471, martins@umbc.edu
  - Eric Russo – senior engineer — 714-395-8453, eric.russo@spacex.com
  - Chris Clark – EPL director — cjclark@pdx.edu
  - Erik Sánchez, PhD – professor — esanchez@pdx.edu
  - Erin Schmidt – former PSAS mechanical lead — esch2@pdx.edu
- Peers
  - Mitch Weiss — mweiss@airphoton.com
  - Douglas Schmidt — daschmid@alumni.cmu.edu
  - Calvin Young — youngcal@pdx.edu
  - Adam Harris — alegendaryhamster@gmail.com
  - Marie House — hmarie@pdx.edu