Portland, Oregon, 97229

Joe Shields

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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, CSS, JavaScript
- Inventor, SolidWorks, NX, Teamcenter, Onshape, Abaqus, AutoCAD, GIMP, Inkscape
- LaTeX, Microsoft Office, Libre Office, Google Docs, et cetera
- Linux, Windows

Experience

- Design Engineer **Oct. 2021 – July 2023**
  Earth and Space Institute and AirPhoton
  - Rescued a 20-million-dollar project by applying physical scaling laws
  - Halved the size of three separate systems through clever architecture changes
  - Performed space-claim, keep-out-zone, and tolerance analyses
  - Designed cameras and optical calibration systems
  - Managed system requirements, interfaces, and performance
  - Designed optics by manually tracing rays in Autodesk Inventor
  - Coordinated with contractors, customers, scientists, and engineers to write system specifications
  - Designed orbital, airborne, and ground-based instruments
  - Solved multi-disciplinary design constraints (mechanical, optical, pneumatic, thermal, etc.)
- Mechanical Lead **Sep. 2019 – Oct. 2021**
  Portland State Aerospace Society (PSAS)
  - Mentored student projects and assembled project teams
  - Maintained equipment and lab space
  - Performed FMEA and root-cause analysis
  - Managed interdisciplinary projects among students and professionals
- Lab Manager **Sep. 2019 – Oct. 2021**
  PSU Electronics Prototyping Lab
  - Maintained equipment and lab space
  - Trained students on prototyping equipment
  - Ran the lab's parts store
- Engineer **Mar. 2019 – Sep. 2019**
  SpaceX
  - 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 **Sep. 2018 – Feb. 2019**
  Pacific Diabetes Technologies
  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
- Mechanical Lead **Dec. 2015 – Mar. 2019**
  Portland State Aerospace Society (PSAS)
  Created an open-hardware carbon fiber rocket airframe for the Portland State Aerospace Society
  Published and presented a conference paper on the project for AIAA SPACE 2016
  Documented design and manufacturing processes to foster institutional knowledge
  Designed parts using hand calculations, prototypes, computer models, CFD, and CAD
- Design Engineer **Jan. 2017 – Mar. 2019**
  OreSat
  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 **Jan. 2018 – Mar. 2019, Sep. 2019 – Oct. 2021**
  Electronics Prototyping Lab
  Same duties listed above

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

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**

Miscellaneous

References can be provided upon request.
I'm only open to engineering work that is either:

- fully remote, or
- hybrid (meaning no more than 24 in-person hours per week) and located in Cascadia (Oregon or Washington state).

Please do not contact me about roles that fail the above criteria.
I'm most interested in design engineering, ideally optomechanical design (though the sub-field isn't a hard requirement). I work very well with scientists and other engineering disciplines (especially electrical engineers). I perform best with minimal oversight. In my ideal workflow, I spend one to two consecutive days coordinating with team members, and three to four consecutive days hyperfocusing on the tasks identified by that coordination.