Nicolas Kessler

Mechanical Engineering | Aerospace Option

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GRADUATION
May 2027

DEGREE
B.S. Mechanical Engineering

GPA
3.72 / 4.0



Seeking full-time mechanical engineering roles

Aerospace · Test Engineering · Advanced Manufacturing · Medical Devices

ABOUT

I approach engineering by understanding the physics, building a model, testing it, and improving the design. Across internships in applied mechanics, precision manufacturing, and airport systems, I have developed hands-on experience in mechanical testing, CAD, instrumentation, data acquisition, metrology, and experimental validation.

TECHNICAL SKILLS

Software

MATLAB · Simulink · SolidWorks · Onshape · Siemens NX · ANSYS · LabVIEW · Python · C · Revit · AutoCAD · Excel

Engineering

GD&T · Precision Metrology · Experimental Testing · Data Analysis · Mechatronics · Root Cause Analysis · Quality Control · 3D Printing · Manual Milling · Soldering

EDUCATION

Rochester Institute of Technology, Rochester, NY

B.S. Mechanical Engineering, Aerospace Option | Mathematics Minor | Expected May 2027

GPA 3.72 | Honors Program | RIT Presidential Scholar | Pi Tau Sigma

Universidad Carlos III de Madrid, Madrid, Spain

Exchange Semester | Spring 2024

Portfolio website

For additional images and project details, visit nicolaskessler.com. Each experience and project shown here has a dedicated page online.

nicolaskessler.com →

EXPERIENCE · MAY–AUGUST 2026

BNP Associates

Airport infrastructure work spanning Revit/BIM modeling, baggage-handling layouts, and AutoCAD Vehicle Tracking studies.

Engineering context

Worked across 8 airport infrastructure projects involving baggage-handling systems, model development, and geometric clearance studies.

My role

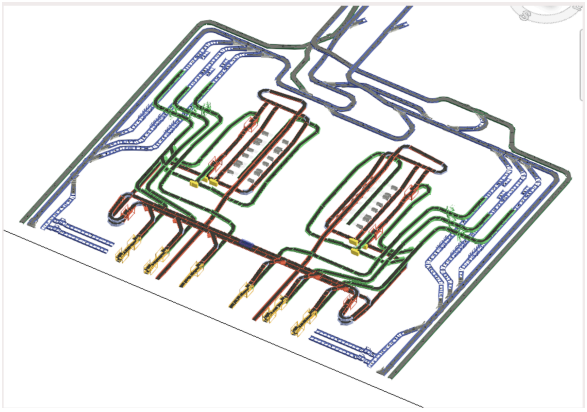
Produced 30 design-option layouts in Revit, recreated an entire client AutoCAD terminal model as a BIM-ready Revit model, and ran 4 swept-path studies.

Vehicle tracking

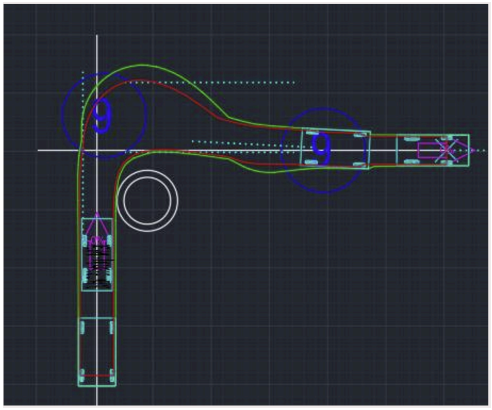
Cataloged 17 ground-support vehicles to create a reference dataset for AutoCAD Vehicle Tracking simulations and clearance studies.

Result

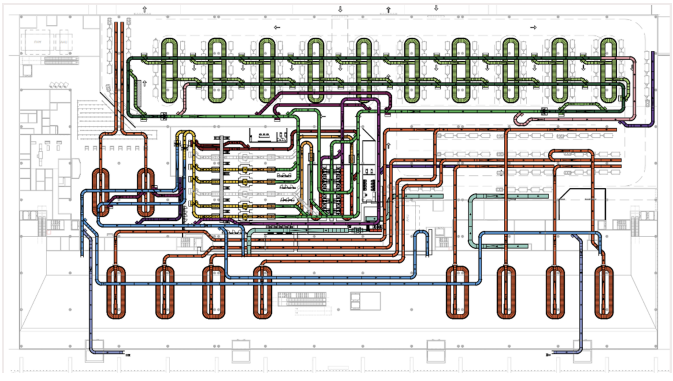
Delivered design alternatives and geometric validation used for downstream coordination, client review, and layout decisions.



Isometric Revit/BIM baggage-handling model



Vehicle swept-path study



Baggage-handling layout and routing



Real airport baggage-handling equipment

Revit AutoCAD Vehicle Tracking BIM Airport Systems

EXPERIENCE · JUNE–DECEMBER 2025

Clarapath

Precision manufacturing and quality engineering for the SectionStar medical-device platform.

Engineering context

Supported SectionStar production through metrology, quality control, documentation, tooling, and assembly support.

My role

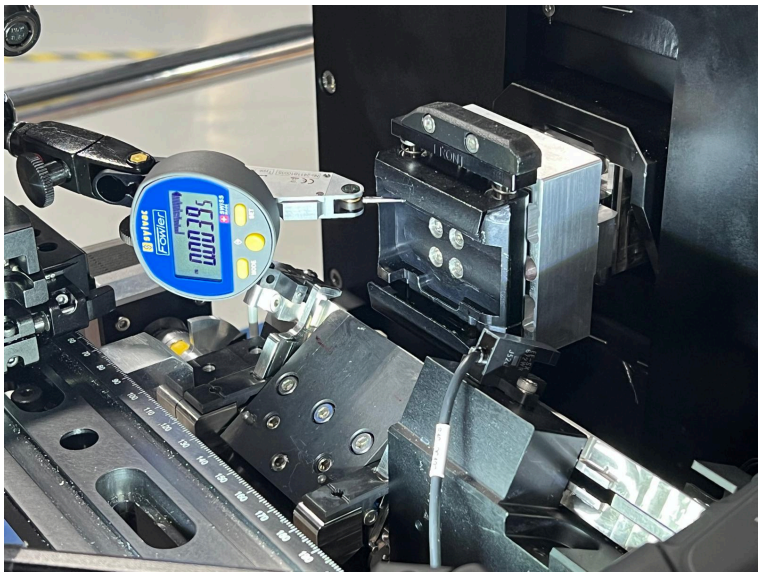
Performed inspection and documentation on 300+ precision components, managed approximately 50% of departmental QC tasks, and trained 5 peers.

Design & tooling

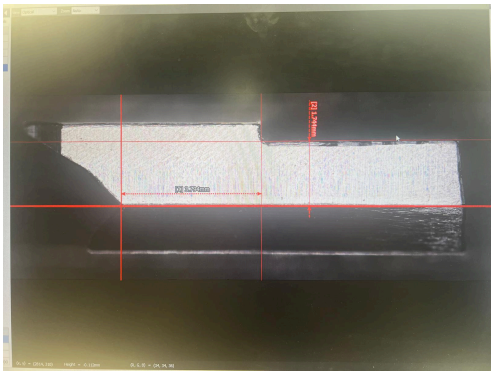
Designed standardized laser-calibration tooling in SolidWorks and developed a shock-preventing equipment cover adopted company-wide.

Standardization

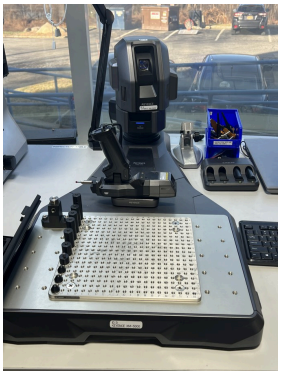
Authored QC training manuals to standardize inspection and training procedures across the production workflow.



Microtome alignment process during SectionStar assembly and calibration



Profilometer measurement for precision inspection



Hand CMM inspection setup

SolidWorks | Precision Metrology | GD&T | Quality Control | Production Engineering

EXPERIENCE · AUGUST–DECEMBER 2024

Copeland

Mechanical test development from fixture and instrumentation design through data acquisition, analysis, and formal reporting.

Scope

Independently owned 9 mechanical test programs end-to-end across applied mechanics and reliability work.

Clamp-load measurement

Developed a capacitor-based clamp-load approach, calibrated it against a 10-kip vertical MTS, and acquired data in LabVIEW.

Torque-to-yield testing

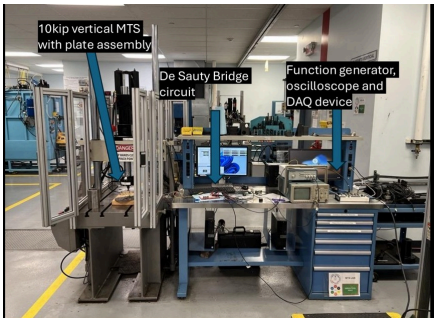
Tested DIN rail end clamps to failure, processed torque-vs-angle data in Python, extracted yield torque, and compared designs statistically.

Solenoid force testing

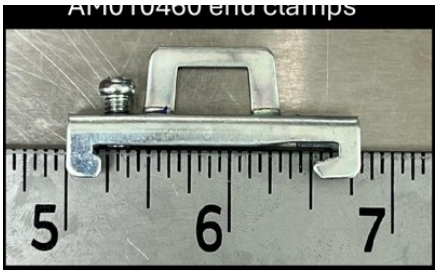
Developed a two-stage solenoid valve test using load-cell force and laser displacement measurements with LabVIEW acquisition.

Result

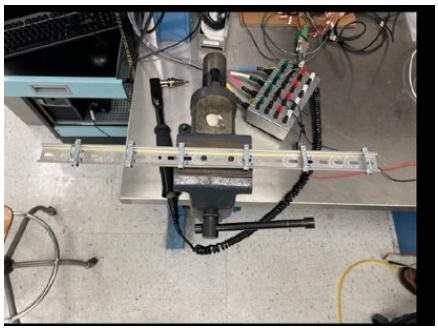
Delivered new test procedures, analysis code, and validated measurement approaches supporting design and reliability decisions.



10-kip MTS clamp-load calibration setup



End-clamp hardware used for torque-to-yield testing



Torque-test fixture and physical setup

LabVIEW · Python · MATLAB · Instrumentation · MTS · Mechanical Testing

PROJECT · MECE 301 · SPRING 2026

High-Velocity Vacuum Launcher

Physics-based modeling and experimental validation of a vacuum-driven launcher for a ping-pong ball projectile.

Objective

Design and validate a vacuum-driven launcher capable of accelerating a ping-pong ball to high velocity.

Modeling

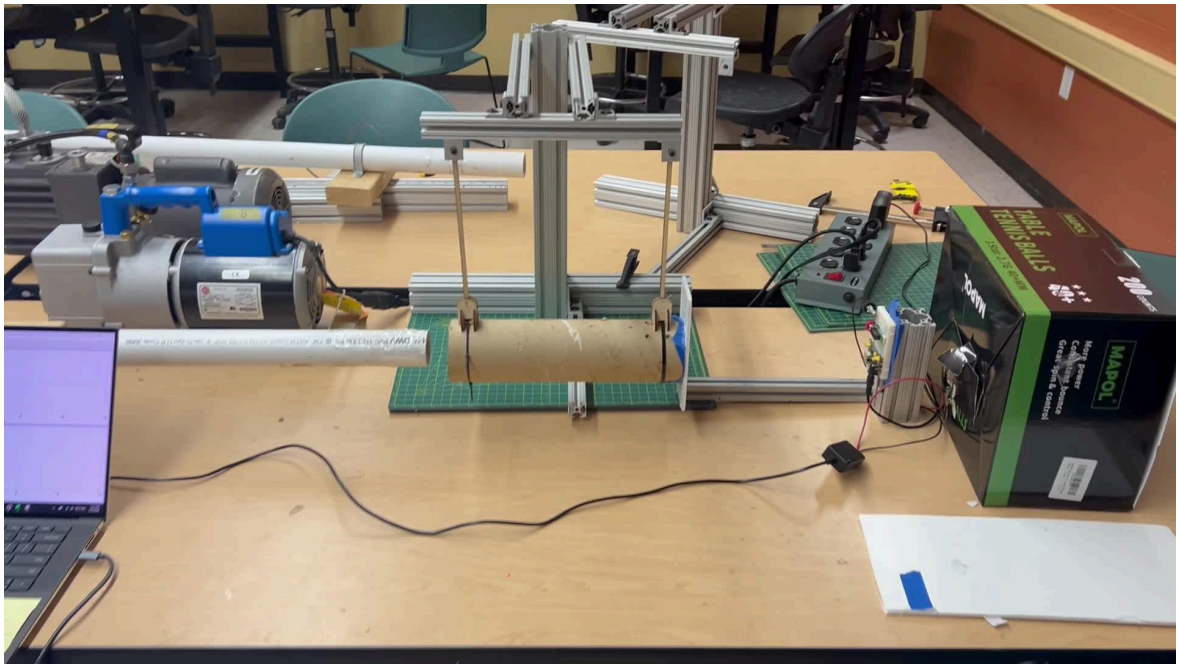
Developed a MATLAB model incorporating compressible flow, pressure losses, adiabatic compression, viscous pipe friction, and Euler integration.

Experimental method

Measured exit velocity with an IR sensor and ballistic-block momentum method, then compared results with the model and uncertainty analysis.

Result

Average measured exit velocity was approximately 196.6 m/s at 5 kPa and 172.0 m/s at 10 kPa.



Vacuum-launcher experimental setup with tube, vacuum hardware, structure, and instrumentation

Trial	Pressure [Kps]	Voltage [V]	X Distance [m]	Y Distance [m]	PE [J]	V_{sys} [m/s]	V_{ball} [n
1	5.46	2.284	0.1084	0.0329	0.2163	0.8036	195.
2	5.44	2.296	0.1096	0.0337	0.2213	0.8130	197.
3	4.96	2.29	0.1090	0.0333	0.2188	0.8083	196.
4	5.26	2.286	0.1086	0.0330	0.2171	0.8052	196.
5	5.32	2.287	0.1087	0.0331	0.2175	0.8060	196.
Avg	3.900285714	2.2886	1.4796	0.0332	0.4135	0.7203	196.

Table 3: Trials at approximately 5kPa showing all steps to calculate exit velocity of ball (V_ball

Trial	Pressure [Kpa]	Voltage [V]	X Distance [m]	Y Distance [m]	PE [J]	V_{sys} [m/s]	V_{ball} [m/s
1	10.12	1.768	0.0977	0.0263	0.1725	0.7177	174.78
2	9.98	1.745	0.0949	0.0246	0.1618	0.6951	169.29
3	10.06	1.768	0.0977	0.0263	0.1725	0.7177	174.78
4	10.08	1.758	0.0965	0.0255	0.1678	0.7079	172.40
5	9.96	1.742	0.0945	0.0244	0.1604	0.6922	168.58
Ave	7.294571429	1.7562	1.4706	0.0254	0.3275	0.6436	171.97

MATLAB | Fluid Mechanics | Instrumentation | Experimental Validation

PROJECT · MECE 301 · SPRING 2026

Pneumatic Tube Terminal Velocity

Transient modeling and experimental validation of carrier motion in a sealed vertical pneumatic tube.

Objective

Predict and measure terminal velocity for carriers moving through a sealed vertical pneumatic tube.

Modeling

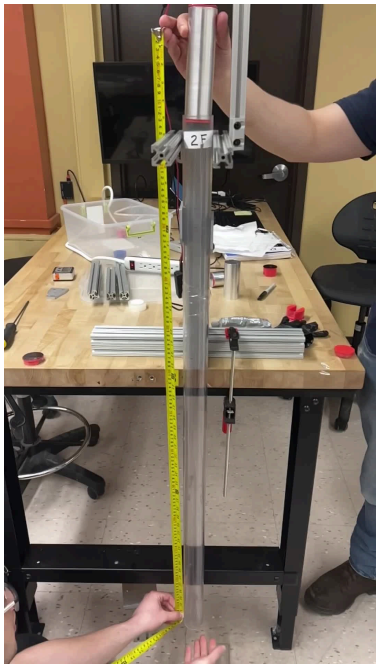
Developed a transient MATLAB model using viscous annular flow and isothermal ideal-gas behavior.

Measurement

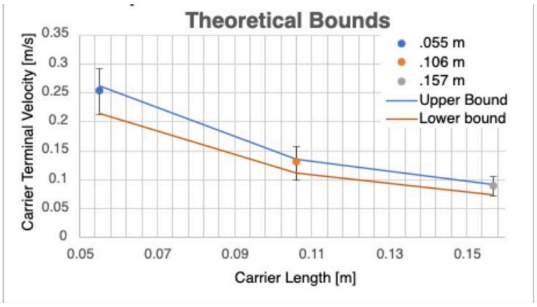
Calibrated an IR sensor using a 10-point polynomial regression and checked the measurements with slow-motion video.

Result

Results met the project's ±10% uncertainty target across 5 cm, 10 cm, and 15 cm carriers.



Vertical pneumatic-tube experimental setup used for carrier terminal-velocity measurements



MATLAB | Fluid Mechanics | Sensor Calibration | Uncertainty Analysis

PROJECT · MECHANICAL DESIGN

Piston CAD, Engineering Drawing & Assembly

Piston CAD, engineering drawing, and assembly work created in Onshape.

Piston assembly

Created a 16-part Onshape assembly documented to ASME Y14.5 conventions.

Documentation

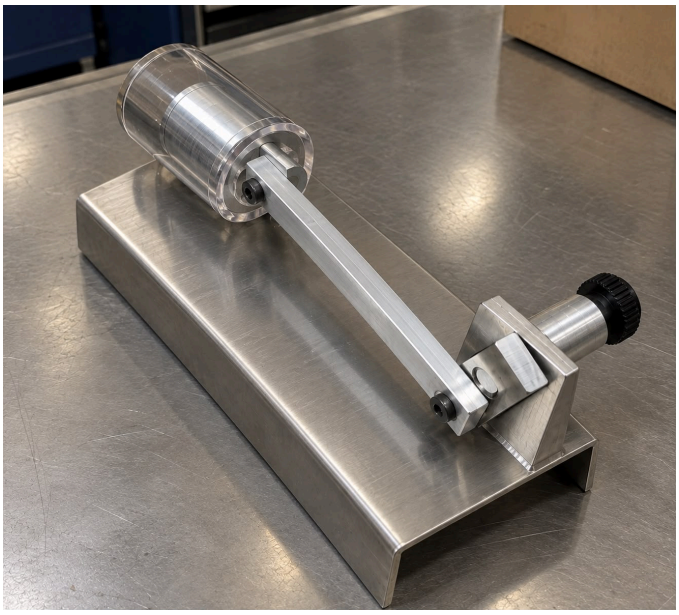
Produced a bill of materials, section view, and manufacturing dimensions for the assembly.

Assembly work

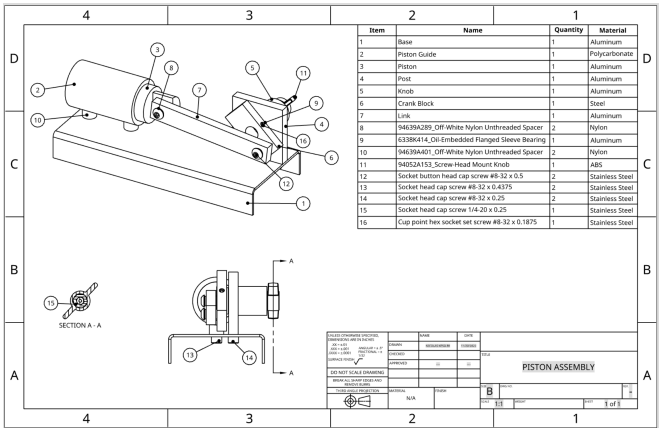
Built and documented a multi-component mechanism with piston, linkage, crank, fasteners, and constrained motion.

Engineering focus

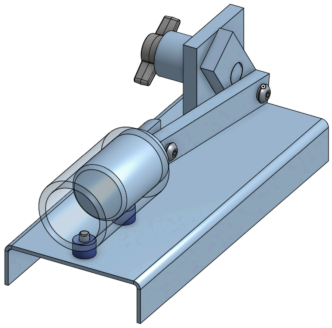
Mechanical layout, design communication, assembly constraints, and formal drawing practice.



Physical piston assembly



Formal engineering drawing with BOM and section view



Onshape CAD render of the piston assembly

Onshape | ASME Y14.5 | GD&T | Mechanical Assemblies

PROJECT · MECHATRONICS

Automated Percussion Machine

An Arduino/C-controlled instrument combining acoustic design, mechanical structure, and stepper-motor actuation.

Objective

Automate musical performance using a mechanically actuated percussion system.

Acoustics

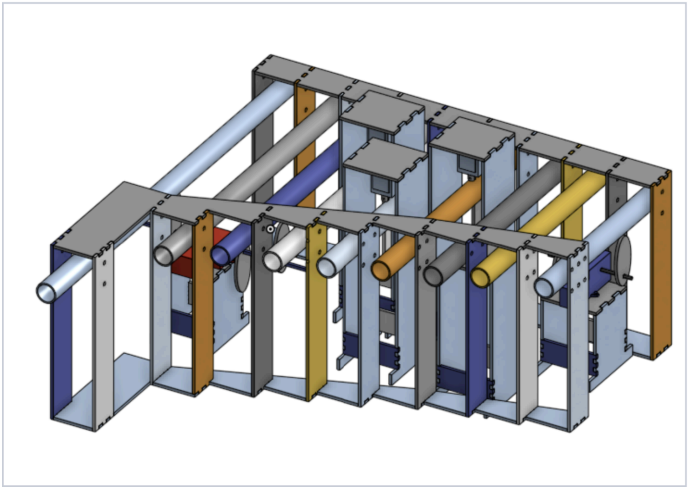
Calculated resonant frequencies to determine tuned-pipe lengths for specific musical notes.

Controls

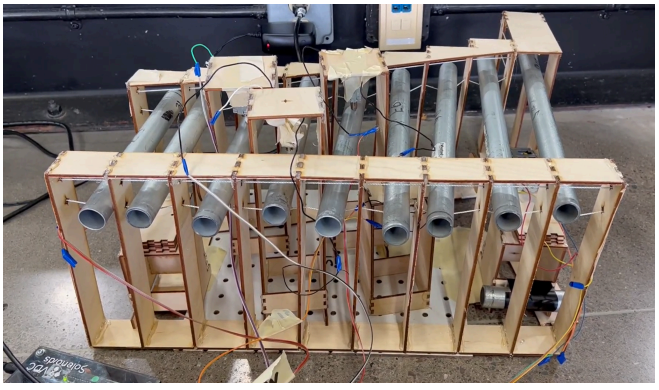
Used Arduino and C to coordinate the system and integrated stepper motors with custom driver logic.

Mechanical function

Controlled striking and damping to produce repeatable tonal output.



CAD assembly of the automated percussion machine



Physical build with tuned pipes, frame, wiring, and actuation hardware

Arduino | C | Mechatronics | Acoustics | Stepper Motors