

SKILLS SUMMARY

Competent Mechanical Engineer (Ph.D.) and a passionate professor with solid theoretical knowledge of Fluid Mechanics, Heat Transfer, Thermodynamics, Computational Fluid Dynamics (CFD), Experimentation and Instrumentation with work experience and vast experience in university teaching (over 10 years) and research where I demonstrated strong work ethic and dedication to high quality performance. Well-acquainted with teaching and leading small size and large size classes, developing numerical models to solve Flow Field, Thermodynamics and Heat Transfer problems. Familiar with the commercial CFD code ANSYS FLUENT and GAMBIT. Possessing strong interpersonal and excellent communication skills.

EDUCATION

- ❖ **Ph.D.**, Mechanical Engineering, Washington State University, Pullman, WA, May 2013, GPA=3.8.
- ❖ **Master's Degree**, Mechanical Engineering, Tarbiat Modares University, Tehran, Iran, June 2007.
- ❖ **Bachelor's Degree**, Mechanical Engineering, Amirkabir University of Technology, Tehran, Iran, 2003.

WORK EXPERIENCE

TEACHING:

Clinical Assistant Professor at Washington State University/Olympic College, Bremerton, WA 08/2013-Present

- ❖ **Thermal System Design ME 405 (26 students)**
 - Books: Yunus Cengel's books and "Thermal Energy Systems" by Steven G. Penoncello, CRC Press (2015)
 - At the beginning of the semester, I taught students how to use EES.
 - Topics: A deeper look into Thermodynamics laws, Power Cycles, Process Cycles, HVAC and Psychrometric Chart, Pumps, Heat Exchangers, A deeper look into momentum and thermal boundary layers...
 - Project: Students designed a Power Plant Rankine cycle using EES (Engineering Equation Solver).
 - Students really appreciated using EES in their project. The majority of them believed that this course reinforced their knowledge of fluids dramatically.
 - Received great reviews from students.
- ❖ **Experimental Design ME 406 (3 Classes in Bremerton, WA: about 25 Students each and 1 Class in Pullman, WA with 12 students)**
 - Delivered Lectured and supervised labs.
 - Covered subjects during lectures: Overview of Thermodynamics laws, EES (Engineering Equation Solver), Powerpoint presentation and public speaking tips, Technical report writing instructions, Engineering ethics, ...
 - Covered Labs: The characterization of Axial fan, Centrifugal fan, Air compressor, Duct heater, water pump, heat pump, Double pipe heat exchanger, Cross flow heat exchanger
 - Invited guests from the industry to give a talk on how to prepare an engineering document.
 - Reviewed the students' reports step by step by working one on one during extended office hours like a mentor.
 - The students improved on presentation and report writing skills by the end of the semester dramatically.

❖ **Mechatronics ME 401 (23 Students)**

- Delivered lectures and supervised labs.
- Covered Subjects: AC current and circuits, Hydraulic circuits, PLC...
- Helped students learn LabView and write a program to simulate a thermal fluids lab.
- Provided assistance for students to write a V+ or a PLC code to control an industrial robot in the lab.
- Helped the students develop a great understanding of AC power and circuits and the ability to calculate total Impedance and Power Factor for complicated circuits.
- Introduced the concepts of Apparent Power, True Power, and finally Power Factor Correction.
- Introduced AC 3-phase Y and Δ configurations and AC 3-phase and single phase motors.
- Encouraged students to improve their knowledge of Fluid Mechanics through teaching the concepts of Hydraulics and Pneumatics.
- Provided practice exams and lecture summaries for students.
- Achieved a great level of interaction with students during the labs and received positive feedback.

❖ **Fluid Mechanics ME 303 (26 students)**

- Book: "Fluid Mechanics" by Yunus Cengel & John Cimbala, 3rd Edition (2014)
- Covered subjects: Fluid Properties, Fluid Statics, Fluid Kinematics & Reynolds Transport Theorem, Bernoulli and Energy Equations, Momentum Equations, Turbulent and Laminar Flows, Internal and External Flows, Navier Stokes Equation...
- Prepared neat lecture notes for students using OneNote and Microsoft Surface Pro.
- Elicited feedback from students and as a result adjusted the lectures based on their needs and backgrounds.
- Scheduled 2 hours of problem session every week outside of class and worked with students in groups to solve problems.
- Provided timely exams and homework assignments.
- Students showed great enthusiasm in Fluid Mechanics and appreciated problems sessions and homework assignments
- Always drew connection between this course and courses such as Thermodynamics, Heat transfer, Thermal Fluids Lab, and Experimental Design to emphasize how important Fluid Mechanics concepts are.

❖ **Statistics STATS 370 (2 Classes: 30 Students each)**

- Prepared the course material and delivered the lectures
- Covered subjects during lectures: Statistical terminology, Presenting data, Probability and Probability Density Functions, Z and t distribution, Hypothesis testing (Z test and t test), Comparing two different populations, F test, Regression, Statistical Process Control...
- Drew a connection between statistics and the lab courses such as Experimental Design and Thermal Fluids to make the statistics more appealing and interesting for students
- Conducted several in class problem sessions and supervised students solving statistical problems.
- As a result of teaching this course, came up with more ideas for the lab courses for which I was responsible

- ❖ **Thermal Fluids Lab ME 306 (5 Classes: 30 students each in Bremerton and 2 Classes in Pullman, WA with about 15 students each)**
 - Prepared the course material, delivered the lectures, prepared the lab instructions and grading rubrics for every single lab from scratch
 - Covered subjects: Fourier series and FFT, Plotting and fitting the data, Data Acquisition Systems, Calibrating pressure transducers, Uncertainty analysis, Pressure measurement instruments, Flow measurement instruments, Dynamic behavior of measurement systems, Thermocouples, Electronic instruments, Filters, Rotational speed measurement, Overview of the laws of Thermodynamics and Fluid Mechanics...
 - Supervised all the labs
 - Students learned how to use STATISTICS (z test, t test, and uncertainty propagation) in real experiments.
 - As a result of working with students, a great level of rapport with students was achieved.
 - At the end, students developed a great understanding of instrumentation, conducting experiments, presenting data in a neat fashion, and analyzing data.

- ❖ **Finite Element Methods ME 313 (4 Classes, about 30 students each)**
 - Delivered lectures and supervised labs.
 - Covered Subjects: Matrix Manipulation, Spring Systems, Truss Systems, 1D, 2D, and 3D Beams, Conduction Heat Transfer
 - Taught handy techniques to find the global stiffness matrix and the reduced matrix equation faster.
 - Introduced the Local and Global Coordinate Systems, Vector Rotation, skewed supports for beams and a variety of mathematical techniques to solve matrix equations.
 - Achieved a great level of interaction with students during the labs by going through their MATLAB codes line by line and teaching them how to write an organized efficient well-documented code.
 - Helped students draw a connection between Beam theory and Finite Element Analysis and compare the results.
 - Helped students draw a connection between Conduction Heat Transfer theory and Finite Element Analysis and compare the results.
 - Provided Practice Exams and Lecture Summaries for students.
 - Received positive feedback from students.

- ❖ **Manufacturing Processes ME 310 (2 Appointments, about 30 students each)**
 - Covered different subjects of manufacturing processes such as casting, forging, Rolling, Extrusion, Drawing, Welding, Powder Metallurgy...
 - Invited guests from the local industry to come and give presentations on their firsthand experience of manufacturing.
 - Gave quizzes after finishing every topic to assure the students' comprehension of the subject taught.

Adjunct Professor at Olympic College/Washington State University, Bremerton,
WA. Summer Session (23 students, 10 labs),

07/2013

❖ **Thermo Fluids lab ME 305:**

- Proved to be capable of working under pressure by teaching a course over 3 weeks which is normally taught over a regular semester.
- Spent more than 320 hours in cooperation with *professor Marvin Pitts* in order to set up thermo fluids lab for the first time in Bremerton, WA.
- Developed lesson plans for all lectures.
- Delivered lectures every day (from 8:30am to 9:30am).
- Tested the new equipment for 10 different labs, carried out the necessary calculations to make sure each lab was working properly. To accomplish this worked every day from 5pm to midnight including weekends.
- Developed all new instructions and grading rubrics for each lab.
- Worked one-on-one with students in the laboratory 7 hours a day (from 10am to 5pm).
- Graded lab reports.
- Achieved great interaction with students and received positive feedback from them

Teaching Assistant at Washington State University, Pullman, WA.

09/2009-05/2013

10 Appointments,

❖ **Thermodynamics ME 301 (3 Appointments):**

- Developed lesson plans for the lectures and recitations.
- Delivered lectures in the professor's absence.
- Responsible for teaching during recitation hours.
- Graded homework papers and quizzes every week.
- Solved the homework problems using EES beforehand to prepare the solutions and also to be able to help the students more effectively.
- Gained experience in teaching large classes (more than 70 students).
- Built up excellent rapport with students and the professor.
- Solidified my understanding of thermodynamics through teaching.

❖ **Fluid Mechanics ME 303 (2 Appointments):**

- Same duties and accomplishments as in Thermodynamics course.
- Solidified my knowledge of Fluid Dynamics through teaching.

❖ **Heat Transfer ME 404 (2 Appointments):**

- Same duties and accomplishments as in Thermodynamics course.
- Improved my grasp of Heat Transfer through teaching.

❖ **Thermo Fluids Lab ME 305 (3 Appointments):**

- For summer sessions, taught three 3-hour sessions every week.
- Developed specific grading rubrics for different labs.
- Had the opportunity to work one-on-one with students with different backgrounds.
- Improved my interpersonal and communication skills.
- Received positive feedback from the majority of students.

Faculty Lecturer at Persian Gulf University, Bushehr, Iran.

01/2008-06/2009

2 Semesters (about 40 students each semester),

❖ **Gas Dynamics (2 semesters):**

- Book: "Modern Compressible Flow: With Historical Perspective" by "John Anderson".
- Developed lesson plans, delivered all the lectures.
- Gave midterm and final exams.
- Understood the value of a solid lesson plan for every session.
- Gained confidence in teaching large classes (more than 40 students).
- Solidified my knowledge of compressible flow through teaching.

❖ **Fluid Mechanics (1 semester):**

- Book: "Fluid Mechanics, Fundamentals and Applications" by "Yunus A. Cengel".
- Same duties and accomplishments as for "Gas Dynamics".

❖ **Internal Combustion Engines (1 semester):**

- Book: "Internal Combustion Engines Fundamentals" by "John Heywood".
- Same duties and accomplishments as for "Gas Dynamics".
- Supervised the students work in groups of 5 on a project which they presented orally at the end of the semester. This project weighed 25% of their final grade.

English Teacher at Apadana language institute, Karaj, Iran.

09/2008-08/2009

3 Levels: Intermediate, Upper Intermediate, and Advanced,

- ❖ **Intermediate:** Book: "Interchange" by "Jack C. Richards". Responsible for teaching English classes. Learned English from a teacher's perspective. Improved on my grasp of vocabulary, grammar, pronunciation, and American accent through teaching. Gained communication skills by working with learners from different walks of life.
- ❖ **Upper Intermediate:** Book: "First Certificate Master class" by "Simon Haines et al." Same duties and accomplishments as for "Intermediate".
- ❖ **Advanced:** TOEFL - IBT: Same duties and accomplishments as for "Intermediate". Helped students who were planning on going to grad school in America and Canada with TOEFL – IBT exam. Taught the strategies necessary to be able to answer TOEFL questions faster and correctly. Also, spend 25% of the class time teaching students how to create effective flashcards and how to review them on a daily basis. Realized the value of working with motivated people. Some of the students entered grad school at reputable schools in America.

RESEARCH:

Research Assistant at Washington State University, Pullman, WA. 09/2009-05/2013

Dissertation title: Numerical Modeling of Thermoacoustic Heat Pumps and Prime Movers With No Stacks and Intermittent Stacks

❖ Code Developing:

- Developed simplified numerical models in MATLAB to study Thermoacoustic engines and heat pumps with no stacks and systems with transverse-pin array stacks.
- Showed that these systems can be more efficient than conventional stack systems. The numerical models predicted up to 60% for the second law efficiencies of the heat pumps and the engines.
- Learned how to write codes more efficiently by using different discretization schemes and how to monitor the code's convergence.
- The first journal paper was published and the second paper will be submitted soon.

❖ CFD Modeling:

- Modeled no-stack Thermoacoustic systems using ANSYS FLUENT and compared the results with the results from the simplified numerical model mentioned above and found very good agreement between them.
- CFD modeling showed that no-stack engines and heat pumps can perform with second law efficiencies as high as 55% with greater power density or heating capacity.
- Learned how to apply oscillatory and time-dependent boundary conditions, temperature-dependent viscosity and conductivity by using UDF's (User Defined Functions) as a code in C++ and calling UDF's in FLUENT.
- Learned how to extract properties of every single cell from FLUENT using UDF's.
- Found the right mesh size, time step, convergence criteria, discretization scheme, and other numerical parameters for modeling acoustic and Thermoacoustic flow that led to reasonable results.
- Acquired the skill of generating mesh using GAMBIT for Thermoacoustic geometries.

Research Assistant at Tarbiat Modares University, Tehran, Iran. 09/2004-05/2007

Thesis title: Numerical Modeling of Cavitation in Diesel Fuel Injector Nozzles.

- Studied cavitation phenomenon in Diesel fuel injector nozzles by receiving generous help through correspondence from *Dr. David P. Schmidt* from University of Massachusetts at Amherst.
- Gained experience in modeling compressible flow.

INDUSTRY:

Mechanical Engineer, Piping Discipline at FARAB Company, Tehran, Iran. 09/2005-05/2007

- Worked with the piping discipline for a gas compressor station project.
- Handled stress analyses in pipes and chose the suitable size and material for the pipes.
- Learned how to collaborate with engineers from other disciplines in order to work more efficiently and develop project documents and specifications.

PUBLICATIONS

- ✓ **Book:** Asgharian, B., "Numerical Modeling of Thermoacoustic Heat Pumps and Engines", LAMBERT Academic Publishing (March 2014), ISBN-13: 978-3659523717
- ✓ **Paper:** Asgharian, B. and Matveev, K., "Influence of finite heat capacity of solid pins and their spacing on thermoacoustic performance of transverse-pin stacks", Applied Thermal Engineering, Vol. 62, No. 2, pp. 593-598 (2014)
- ✓ **Paper:** Asgharian, B. and Matveev, K., "Numerical modeling of thermoacoustic no-stack heat pumps and prime movers", Engineering Applications of Computational Fluid Mechanics, Vol. 6, No. 3, pp. 346-355 (2012)
- ✓ **Book:** Asgharian, B., Javadi, S. and Darvishi, M., "A comprehensive Guide to CAESAR II", AFRANG Publications, Tehran, Iran (2009), ISBN-13: 978-6005060157

HONORS/AWARDS

- ✓ Mechanical Engineering Department of WSU: Nominated for the **Outstanding TA** award in 2011.
- ✓ Graduate and Professional Student Association at WSU (GPSA): **TA Excellence Award** in Fall 2012.

RELEVANT COURSEWORK

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|--|---------------------------------------|
| ✓ Convection Heat Transfer | ✓ Advanced Macroscopic Thermodynamics |
| ✓ Conduction and Radiation Heat Transfer | ✓ Finite Difference CFD |
| ✓ Advanced Fluid Dynamics | ✓ Finite Volume CFD |
| ✓ Combustion | ✓ Gas Dynamics (Compressible Flow) |

CERTIFICATIONS/WORKSHOPS

- ✓ "Effective Teaching Workshop" by Richard Felder & Rebecca Brent (2015)
- ✓ Graduate Teaching Workshops at WSU (2010, 2011, 2012)
- ✓ The Graduate Grant Writing Workshop at WSU (2013)

TECHNICAL SKILLS/INTERESTS

- ✓ **Major Interests:** CFD, Numerical Modeling, Combustion, Thermodynamics, Heat Transfer, Fluid Mechanics, Turbo machinery
- ✓ **Computer Skills:** ANSYS FLUENT, GAMBIT, MATLAB, Maple, C++, EES, Refprop, AutoCAD, Microsoft Office, LabView

LEADERSHIP SKILLS

- ✓ Leader of the Mechanical Engineering Department hiking group at Amirkabir University of Technology during my Bachelor's years (2000-2003)
- ✓ Founder and leader of a well-organized hiking group at FARAB Company (2006). Climbed the highest peaks in Iran including Mt. Damavand (5610m, 18,406ft). Gained strong leadership skills by leading different people from entry level to senior engineers in a hiking group.

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NON-TECHNICAL COMPETENCIES

- ✓ Excellent communication skills
- ✓ Honesty and integrity
- ✓ Strong work ethic
- ✓ Self-confidence
- ✓ Very enthusiastic about fitness and hiking
(Climbed Mt. Adams and Mt. Saint Helens in Washington State)
- ✓ Positive inspiring attitude to set personal goals
- ✓ Sense of humor
- ✓ Commitment & Discipline
- ✓ Multicultural Experience