

# DIPL.-ING. DR. GERHARD REGNER

Grazer Straße 4 / Top 1 • 8605 Kapfenberg, Austria • Phone +43 664 4266576 •  
gerhard.regner@gerhard-regner.com

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My experience in leadership, program management, research and development:

- Highly analytical, performance-driven engineering professional with 20+ years' experience in research and development.
- Executive level leadership experience in leading and managing engineering professionals with a broad variation of skill sets in research and series production programs; able to build and guide top-performing engineering teams.
- Experience in program management and building as well as maintaining customer relationships.
- Expertise in applied research, new engine concept development, process development, simulation and validation.
- Broad knowledge in internal combustion engines, build for a variety of applications in automotive and other industries.
- Superior problem-solving and time management abilities.
- Several issued and pending patents in US, Europe and worldwide.
- Team spirit with effective communication and presentation skills.

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## PROFESSIONAL EXPERIENCE

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### ENGINEERING CONSULTANCY - MECHANICAL ENGINEERING, 2020 – present

Self Employed – Kapfenberg, Austria

Offering engineering consulting in the field of mechanical engineering, especially in automotive engineering. Special experience in the thermodynamics of the internal combustion engines. Proficient in the use of software packages like GT-Power, WAVE and AVL BOOST.

### VICE PRESIDENT, PERFORMANCE & EMISSIONS, 2013 – 2020

ACHATES POWER, INC. – San Diego, California

Part of the executive leadership team of Achates Power, Inc. Responsible for the performance and emissions development of the opposed-piston two-stroke engine in multiple bore sizes from light duty to high power gen-set applications.

- Providing technical expertise in performance and emission to guide the research and development
- Leading a team of up to 15 engineering professionals with a broad variation of skill sets and nationalities.
- Providing guidelines and coaching to the team to drive further improvements of the efficiency of the opposed-piston two-stroke engine and at the same time to keep emissions within the legislation limits for the different applications.
- Representing the company by presenting the latest results of the development at engineering conferences and in front of customers worldwide.
- Maintain innovative team environment to increase the number of patents protecting the intellectual properties around opposed-piston engine.

### **Major Accomplishments:**

- ✓ Building a high-performance team of engineering professionals.

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*Professional Experience Continued*

- ✓ Landing multiple engine development contracts from the US Department of Defense and Department of Energy. Delivering on the performance and emissions targets to ensure follow-up contracts.
- ✓ Landing an engine development contract with a worldwide operating OEM
- ✓ Hardware demonstration of major brake thermal efficiency gains for light-duty and heavy-duty applications.

**DIRECTOR, APPLICATIONS ENGINEERING, 2009 – 2012**

ACHATES POWER, INC. – San Diego, California

Responsible for the technical representation of Achates Power's opposed-piston two-stroke engine in front of prospective customers and providing technical expertise in applications engineering to the engineering team. Processing customer specific requirements and leading performance evaluation projects.

- Definition of requirements and targets together with the customer.
- Analytical investigation to define main engine parameters based on available engine data.
- Leading design and analysis for the concept design of the engine.
- Defining test plans and procedures in order to validate the new design to fulfill the specified set of requirements

**Major Accomplishments:**

- ✓ Major contribution to the configuration and calibration of the air handling system in order to achieve a 15 to 20% improvement in fuel consumption compared to a conventional 4-stroke diesel engine for HD applications.
- ✓ Support in the development of processes to ensure quality and repeatability of measurements and simulation results.
- ✓ On-time completion of a concept readiness project with a prospective customer in leadership position.
- ✓ Technical presentations in front of major engine OEM's in USA, Europe and China
- ✓ Writing and presenting technical papers at several occasions.

**SKILL TEAM LEADER, 2004 – 2009**

AVL POWERTRAIN ENGINEERING, INC. – Plymouth, Michigan

Developed and managed a team of up to 15 engineers working in the area of thermodynamics and computational fluid dynamics (CFD). The team was responsible to support the design and development of engines by performing

- One dimensional engine simulation to support the design and component selection of turbochargers, coolers and ducting around an engine. Also supporting the development by correlating simulation results to measured performance data to provide a deeper understanding of the thermodynamics of engines.
- Three dimensional CFD simulations to support the design to build better quality and reliable components.
- Vehicle performance simulations to predict and evaluate the engine performance in an vehicle
- Cooling and lubrication system layout and design of pumps, radiators, fans and other components.

**Major Accomplishments:**

- ✓ Build a high performing team of engineering professionals responsible for one and multi dimensional fluid dynamics analysis supporting the development of internal combustion engines in research and series production programs.

*Professional Experience Continued*

- ✓ Development of processes and methods in order to improve the quality as well as the turnaround time of simulation results.
- ✓ Diversification of skill sets within the team to be prepared for all kind of challenges in engine development.
- ✓ Part of the leadership team of a series production program to design and develop the Ford Powerstroke 6.7L V8 diesel engine and responsible for the whole thermodynamics analysis work during design and testing phase.
- ✓ Leading the team to deliver projects on time for different applications like light, medium and heavy duty on-highway applications as well as agricultural, locomotive and industrial applications.

**SENIOR PROJECT ENGINEER, 1998 – 2004**

AVL List GmbH – Graz, Austria

Senior member of the applied thermodynamics skill team. Responsible for performing and delivering one dimensional engine simulations to support the design and development of internal combustion engines for a broad variety of applications.

***Major Accomplishments:***

- ✓ Simulation of internal combustion engines using the AVL BOOST simulation code.
- ✓ Engine warm-up simulation of engines running a transient cycle using the CRUISE-BOOST-FLOWMASTER co-simulation.
- ✓ Transient engine control in simulations using MATLAB/SIMULINK.
- ✓ NOx emission prediction in Diesel engines using the AVL MCC combustion model and 3D CFD FIRE generated heat fluxes.
- ✓ Developing the gas exchange simulation process using BOOST.
- ✓ Technical support of key account managers in acquisition of customer projects.
- ✓ Project leader for R&D projects inside the skill team since 2000.
- ✓ Project leader for customer founded projects since 2002.
- ✓ Technical expert for advanced thermodynamic analysis since 2004.

**RESEARCH ASSISTANT, 1991 – 1998**

TECHNICAL UNIVERSITY GRAZ – Graz, Austria

Research assistant at the Institute for Internal Combustion Engines and Thermodynamics.

***Major Accomplishments:***

- ✓ Cycle per cycle calculation of the excess air ratio of gasoline engines using the measured cylinder pressure history.
- ✓ Developed a cavitation simulation model based on the bubble dynamic theory to predict cavitation within high pressure Diesel injection pumps.
- ✓ Developed a high pressure engine cycle analysis and simulation code (MOSES)
- ✓ Responsible for the Diesel injection equipment component test bench.

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*Professional Experience Continued*

- ✓ Responsible for the computer systems and network peripherals of the institute.

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**EDUCATION & CREDENTIALS**

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**PhD for Internal Combustion Engines, 1998** • Technical University of Graz, Graz, Austria  
**Masters Degree in Mechanical Engineering, 1990** • Technical University of Graz, Graz, Austria

**Trainings and Seminar:**

- “Managing Engineering & Technical Professionals”, SAE Seminar, 2007
- “Management Development Program”, AVL internal program, 2008

**Languages:**

**German: Native Speaker** (born and raised in Austria)  
**English: fluent** (living in USA since 2004)

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**Publications**

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- [1] **Regner G.:** „Analytische Untersuchung der zyklischen Schwankungen in Verbrennungsmotoren“. In Der Arbeitsprozeß des Verbrennungsmotors, Tagung, Graz, 1993
- [2] Koegeler H.-M., **Regner G.**, Sams T., Gschweidl K.: “Using simulation and optimization tools to decide engine design concepts”. SAE-Paper 2000-01-1267, Detroit, 2000
- [3] Ludu A., Betto A., **Regner G.:** “Endoscope videos of compressor valve motion and pressure measurement assist simulations for design improvements”. International Compressor Conference, University of Purdue, USA, 2000
- [4] **Regner G.**, Hariyanto A.: „Blasendynamisches Kavitationsmodell zur Simulation von Dieseleinspritzsystemen“. In MTZ 61/7-8, 2000
- [5] Sams T., **Regner G.**, Chmela F.: „Integration von Simulationswerkzeugen zur Optimierung von Motorkonzepten“. In MTZ 61/9, 2000
- [6] **Regner G.**, Loibner E., Schuemie H., Frings M., Engelmayer M.: „Neues Simulationsverfahren zur Berechnung des Verbrauchs- und Emissionsverhaltens“. 5. Automobiltechnische Konferenz 2001, Wiesbaden, 2001
- [7] V. Caika, H. Ofner, **G. Regner**, M. Jelovic: “Cavitation in Fuel Lines and its Effect on Unsteady Flow in Fuel Injection Systems”, JSAE-Paper 20015337, Tokio, 2001
- [8] **Regner G.**, Loibner E., Krammer J., Walter L., Truemner R.: “Analysis of Transient Drive Cycles using CRUISE-BOOST Co-Simulation Techniques”. SAE Paper 2002-01-0627, Detroit, 2002
- [9] C. Samhaber, A. Wimmer, E. Loibner, , **G. Regner:** “Analysis of the Vehicle Performance Using Transient Co-Simulation Techniques”. JSAE-Paper 20025354, Tokio, 2002
- [10] **G. Regner**, K. Mahmoud: “1-D Simulation Approach for Vehicle Thermal Management Systems”. Flowmaster User Meeting, Tokyo, 2003

- [11] **G. Regner**, H. Teng, P. Van Wieren: "*Performance Analysis and Valve Event Optimization for SI Engines Using Fractal Combustion Model*". SAE Paper 2006-01-3238, Toronto, 2006
- [12] S. Hajireza, **G. Regner**, A. Christie: "*Application of CFD Modeling in Combustion Bowl Assessment of Diesel Engines Using DoE Methodology*". SAE Paper 2006-01-3330, Toronto, 2006
- [13] H. Teng, **G. Regner**: "*Fuel Injection Strategy for Reducing NOx Emissions from Heavy-Duty Diesel Engines Fueled with DME*". SAE Paper 2006-01-3324, Toronto, 2006
- [14] **G. Regner**, H. Teng: "*Waste Heat Recovery of Heavy-Duty Diesel Engines by Organic Rankine Cycle Part I: Hybrid Power System of Diesel and Rankine Engines*". SAE Paper 2007-01-0537, Detroit, 2007
- [15] **G. Regner**, H. Teng: "*Waste Heat Recovery of Heavy-Duty Diesel Engines Using Organic Rankine Cycle Part II: Working Fluids for WHR-ORC*". SAE Paper 2007-01-0543, Detroit, 2007
- [16] H. Teng, **G. Regner**: "*Characteristics of Soot Deposits in EGR Coolers*". SAE Paper 2009-01-2671, Detroit, 2009
- [17] H. Teng, **G. Regner**: "*Improving Fuel Economy for HD Diesel Engines with WHR Ranking Cycle Driven by EGR Cooler Heat Rejection*". SAE Paper 2009-01-2913, Detroit, 2009
- [18] H. Teng, **G. Regner**: "*Particulate Fouling in EGR Coolers*". SAE Paper 2009-01-2877, Detroit, 2009
- [19] R. Herold, M. Wahl, **G. Regner**, J. Lemke, D. Foster: "*Thermodynamic Benefits of Opposed-Piston Two-Stroke Engines*". SAE Paper 2011-01-2216, presented at Commercial Vehicle Engineering Congress, Chicago, 2011
- [20] **G. Regner**, R. Herold, M. Wahl, E. Dion, F. Redon, D. Johnson, B. Callahan, S. McIntyre: "*The Achates Power Opposed-Piston Two-Stroke Engine: Performance and Emissions Results in a Medium-Duty Application*". SAE Paper 2011-01-2221, presented at Commercial Vehicle Engineering Congress, Chicago, 2011
- [21] **G. Regner**, R. Herold, M. Wahl, J. Lemke, E. Dion, F. Redon: „*Das Wiedererwachen des Zweitakt Gegenkolben Dieselmotors für Nutzfahrzeuge*“. presented at „Der Arbeitsprozess des Verbrennungsmotor“, Graz, Austria, 2011
- [22] **G. Regner**, J. Koszewnik, F. Redon: „*Modernizing the Opposed-Piston, Two-Stroke Diesel Engine for More Efficient Commercial Vehicle*“. presented at “7<sup>th</sup> MTZ Conference Heavy-Duty, On- and Off-Highway Engines”, Nürnberg, Germany, 2012
- [23] **G. Regner**, J. Koszewnik, R. Venugopal: „*Optimizing Combustion in an Opposed-Piston Two-Stroke Diesel Engine*“. In “International Engine Conference”, Baden-Baden, Germany, 2014
- [24] **G. Regner**, J. Koszewnik, F. Redon, Z. Bako: „*Meeting the most stringent CO2 standards with opposed-piston engines*“. presented at “International Engine Conference”, Baden-Baden, Germany, 2015
- [25] **G. Regner**, A. Salvi, L. Fromm, F. Redon: „*The Opposed-Piston Engine: The Next Step in Vehicle Efficiency*“. presented at “2016 VDI Conference – Innovation Drives”, Dresden, Germany, 2016

*Professional Experience Continued*

- [26] **G. Regner**, F. Redon, M. Subramanian: „*Compression Ignition Reborn*”. presented at “FEV Diesel Powertrain 3.0”, Birmingham, England, 2018

**Patents**

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- [1] [Gerhard Regner - Google Patents](#)