

# NATHAN MURPHY

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EDUCATION	<b>University of Michigan, Ann Arbor</b> <b>B.S.E., Mechanical Engineering 1996</b> <i>Focus: mechanical systems design and analysis, thermodynamics</i>
AUTOMOTIVE EXPERIENCE	<b>IAV, Inc.,</b> Dearborn, Mich. — <i>Chief Engineer, Gasoline Emissions and Performance</i> (2004-present) Worked as technical specialist in gasoline engine development and calibration Developed technical library for internal engine and engine controls technology Developed training plans for current and future employees working in calibration Developed quoting templates for gasoline engine calibration projects Submitted customer quotes for all gasoline engine work Developed performance metrics for novel ETC control algorithm Developed calibration test automation for dynamometer calibration Developed specification for power distribution system for calibration instrumentation Worked on project teams for Japanese, German, Canadian, and American customers  <b>Cosworth Technology, Inc.,</b> Dearborn, Mich. — <i>Project Engineer</i> (1998) Gained experience with engine management and OBDII systems at Ford Motor Co. Worked as field engineer performing root cause analysis on problems with OBDII systems Gained hands-on experience with engine diagnosis and OBDII systems  <b>Johann A. Krause, Inc.,</b> Auburn Hills, Mich. — <i>Project Engineer</i> (1997-1998) Defined and maintained program budgets and timelines Created design and build specifications from customer requirements and ensured customer expectations were met Worked as engineering liaison between German and North American divisions Designed powertrain assembly automation  <b>Johann A. Krause Maschinenfabrik GmbH,</b> Bremen, Germany — <i>Engineering Trainee</i> (1996 - 1997) Enrolled in 12 month training program under Thyssen Maschinenbau AG Learned mechanical design principles and company standards Designed and assembled powertrain assembly automation Interacted with customers through equipment buy-offs and project planning  <b>Oak Ridge National Laboratory, Applied Systems Technology Section</b> — <i>Research Assistant</i> (1993) Conducted research in controlling chaotic systems Programmed simulations of chaotic dynamic systems (including IC engines) and analyzed time series data Prepared damped & driven pendulum system for experiments with researched control methods
CALIBRATION EXPERIENCE	<b>IAV Inc.,</b> Ann Arbor, Mich. — <i>Senior Engineer</i> (2003 - present) Technical lead for complete engine management system development and implementation Technical lead for integration of ECU, EMS and a novel emissions control device in a demonstration vehicle Developed specifications for all engine management algorithms and novel control system Specified performance metrics for electronic throttle control, knock control, EGR and purge control Created algorithms including fuel control, lambda sensor heater control, exhaust temperature model Calibrated all functions of the engine management system Conducted dynamometer and vehicle testing as well as customer presentations  <b>Robert BOSCH Corporation,</b> Farmington Hills, Mich. — <i>Assistant Project Leader</i> (2002 - 2003) Released MY2004 Saturn L300 3.0L V6 calibration Enabled customer to remove engine components while improving warranty, emissions, drivability and fuel economy Total vehicle manufacturing cost savings: \$7 million over 2 model years Certified to Bin 8 emissions standard, emissions below Bin 5 Responsible for releasing all data for all functions and emissions certification Calibrated emissions, fuel control, drivability, charge detection, component protection, and all start algorithms Conducted testing at GM Technical Center, MPG, Denver VEL and Mesa DPG

**Robert BOSCH Corporation**, Farmington Hills, Mich. — *Calibration Engineer* (2001 - 2003)

Worked on calibration team for MY2004 Cadillac CTS/SRX/STS 3.6L V6

Calibrated steady-state emissions for Bin 5 standard

Calibrated fuel control, lambda sensor control functions, OBDII fuel system monitor and temperature models

Conducted testing at GM Technical Center, MPG, Denver VEL and Mesa DPG

Developed test procedures for manifold pressure sensor location

Developed calibration procedure for engine metal over-temperature protection algorithm

**LOTUS Engineering, Inc.**, Ann Arbor, Mich. — *Calibration Engineer* (2000 - 2001)

Calibrated and certified LOTUS Esprit for 2001 EUIII and 2002 TLEV emissions compliance

Gained experience running engine dynamometer testing for catalyst aging and emissions compliance

Developed alternate engine control strategy for catalyst aging on dynamometers

Developed engine calibration for heavy-duty transient testing on engine dynamometers

**Cosworth Technology, Inc.**, Neckarsulm, Germany / Novi, Mich. — *Calibration Engineer* (1999 – 2000)

Gained calibration experience with AUDI AG at the Neckarsulm facility

Trained at BOSCH – Schwieberdingen for ME 7 engine management system calibration

Calibrated OBDII secondary air and catalyst monitors

Calibrated emissions for TLEV, LEV, ULEV, and EUIV applications

PUBLICATIONS Engine Torque Mapping Using Computer-Aided Calibration. The Proceedings of the 2005 SAE Congress  
S. Al-Assadi, J. Breitingner, N. Murphy. Paper 2005-01-0055, Publication SP-1975.

Tuning an Electronic Throttle Controller Using Computer-Aided Calibration Methods. The Proceedings of the 2006  
SAE Congress. S. Al-Assadi, J. Breitingner, N. Murphy. Paper 2006-01-0307, Publication SP-2028.

Model-Based Friction and Limp-Home Compensation In Electronic Throttle Control Systems. The Proceedings of the  
2006 SAE Congress. S. Al-Assadi, J. Breitingner, N. Murphy. Paper 2006-01-0857, Publication SP-2003.

PRESENTATIONS “Turbo-charging Spark-Ignition Engines”. IAV Inc. Automotive Engineering. Internal Training, October 2004.

“Internal Combustion Engine Basics”. IAV Inc. Automotive Engineering. Internal Training, November 2005.

“Gasoline Engine Emissions”. IAV Inc. Automotive Engineering. December 2005.

“Gasoline Engine Control Basics”. IAV Inc. Automotive Engineering. February, 2006.

“Gasoline Calibration Fundamentals”. IAV Inc. Automotive Engineering. Internal Training, April, 2006.

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**SKILLS** Engine cold-start, emissions, drivability and OBDII calibration techniques  
Model-Based Calibration techniques  
BOSCH Engine management system (Motronic ME7 and ME9)  
LOTUS Engine management system and calibration tools  
MoTeC Engine management system and calibration tools  
Ford Engine management system (EEC-IV/V) and calibration tools (VDAS)  
ETAS Calibration tools (VS100/INCA)  
dSPACE Calibration tools (CalDesk)  
dSPACE Auto-code generation (Targetlink)  
MATLAB Simulink  
Conversational written and spoken German, with technical vocabulary

**PROFESSIONAL ACTIVITIES** Society of Automotive Engineers (SAE) — Member since 1998  
Member, SAE J1699-3 and SAE J2534-3 Taskforce Teams  
American Society of Mechanical Engineers (ASME) — Student Section President 96; Member 1993-2001  
The Epeians: The Univ. of Mich. Engineering Leadership Honor Society — 1996  
Pursuing PE Certification, passed the FE Examination April 1996

**INTERESTS** Vice President, University Lowbrow Astronomers, Ann Arbor, Mich.  
Member, Observatory Committee, University Lowbrow Astronomers  
Music performance and composition (the STRANGE – <http://strangemusic.net>)  
Vintage sports car restoration and racing: 1960 MGA, 1985 Mercedes-Benz 190E 2.3-16