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Martin Vlach, Ph.D.
Founder and Chief Executive Officer

Alan Mantooth, Ph.D.
Cofounder and Chief Scientist

Barbara Bakken
Cofounder and Chief Operating Officer

Patrick Dunn
Chief Financial Officer

Media Contact

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Fact Sheet

Corporate Details

Lynguent, Inc. is an innovator in delivering model development and management solutions to integrated circuit and electronic systems design companies. Lynguent's tools revolutionize modeling tasks by replacing traditional HDL-based coding methods with graphical development of simulation models.

Company founded	2001
Funding	Private
Employees	16
Headquarters	2828 SW Corbett Avenue Portland, Oregon 97201 United, States
R&D centers	Fayetteville, Arkansas Prague, Czech Republic
Contact	503.241.7195 www.lynguent.com

Management Team

Dr. Martin Vlach	Founder, Chief Executive Office
Dr. Alan Mantooth	Co-founder, Chief Scientist
Barbara Bakken	Co-founder, Chief Operating Officer
Patrick Dunn	Chief Financial Officer
Jim Holmes	Vice President Research and Applications Consulting
Ernst Christen	Vice President, Engineering
Eva Solarova	General Manager Lynguent s.r.o., Prague, Czech Republic

Products

ModLyng™, Lynguent's integrated modeling environment, revolutionizes the way HDL-based simulation models are created, managed, and supported for analog, digital, and mixed-signal domains. Using ModLyng's graphical modeling technology, modeling tasks can be completed in a fraction of the time required for traditional text-based methods. Two independent university studies demonstrated that ModLyng reduces, by at least a factor of 10, the time and cost required to create and support simulation models.

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Overview

Dr. Martin Vlach founded Lynguent, Inc. in 2001 as an independent consultancy firm. In 2004 the business was restructured as a privately held company to focus on Electronic Design Automation (EDA) productivity tools. Headquartered in Portland, Oregon, Lynguent supplies integrated analog and mixed-signal (AMS) design development products to the global semiconductor and electronics industries. Customers use Lynguent's productivity tools and services to create, maintain, reuse, debug, and validate AMS models to accelerate time-to-market for a wide range of state-of-the-art integrated circuits (ICs) and electronic systems.

In addition to Dr. Vlach, Lynguent is staffed by electronics industry veterans including co-founders Dr. Alan Mantooth and Barbara Bakken. Lynguent has research and development centers in Fayetteville, Ark., and Prague, Czech Republic.

Target Markets

Lynguent is focused on delivering superior solutions for breaking the AMS modeling bottlenecks common to many industries. Using Lynguent's model development technologies, semiconductor and electronic systems companies alike can speed time-to-market and build profitability through dramatically improved engineering productivity. Lynguent's tools provide practical modeling solutions across broad technology markets and applications, including:

- Complex electronic systems used in communications, transportation, and military/aerospace applications
- Power management systems used in portable and personal electronics including smart phones, portable media players, navigation systems and computers
- Sensors and actuators used to measure real world parameters (temperature, pressure, noise, etc.) and prevalent in medical, agricultural, automotive, aerospace, and consumer electronics
- Invasive and non-invasive imaging systems, biological monitoring systems, and bio-medical devices used in the healthcare industry

Funding

In addition to revenue from ongoing consulting work, Lynguent is funded through government and private sources. Since its inception, approximately \$2M in revenue has been generated primarily through government grant work and consulting. In 2006, Lynguent was awarded a Phase II Small Business Innovation Research (SPIR) grant by the National Aeronautics and Space Administration (NASA), and a Phase II SBIR grant by the Defense Threat Reduction Agency

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(DTRA). The NASA grant funds the development and commercialization of AMS modeling technology; the DTRA grant funds the development and commercialization of tools for modeling the effects of radiation on electronic circuits. To date, the company has also received approximately \$2M in private investment, including \$1.6M from its founders.

Sales

Lynguent manages sales through a third-party sales representative experienced in the EDA industry and having numerous contacts in the semiconductor and electronic systems markets.

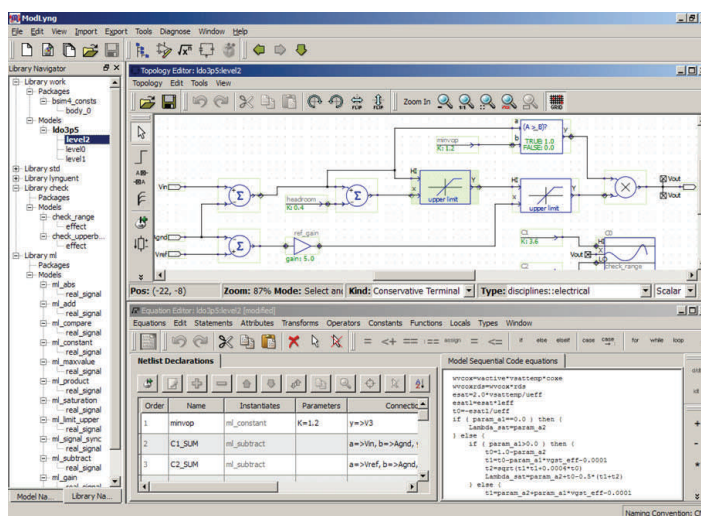
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Products

ModLyng™ Integrated Modeling Environment

ModLyng™ is an integrated modeling environment that revolutionizes the way HDL-based simulation models are created, managed, and supported for analog, digital, and mixed-signal domains. Using a graphical topology editor, users work with a model much like circuit designers work with a design in a schematic editor. They select elements from libraries of mathematical and functional building blocks and assemble them to create a model's topology. ModLyng represents the topology and its supporting details in a language-neutral format. Once the model is complete, ModLyng converts the graphical topology into a complete Verilog-A/AMS or VHDL-AMS model to support popular simulation environments including Cadence®, Mentor Graphics®, and Synopsys®. Two independent university studies demonstrated that ModLyng reduces, by at least a factor of 10, the time and cost required to create and support simulation models.



Corporate Collaboration

ModLyng is key to an effective design collaboration process, both within and across organizations. Using models to communicate design requirements, all groups associated with a project can utilize ModLyng to create, verify and update specifications. Experienced modeling engineers can develop and maintain model libraries. New modeling engineers can learn the details of a model, and become proficient in model development, without analyzing line after line of HDL code. Design engineers, who may only need an occasional tweak to a standard model, can quickly customize a model to meet specific analysis requirements. Test engineers can quickly add assertions and test points to a model to satisfy particular testing needs.

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Benefits

- Use graphical, object-oriented building blocks to create model topologies; maintain and update models at the graphical topology level rather than the text-editor level
- Generate models in Verilog-A/AMS or VHDL-AMS without using or knowing specific HDL syntax; focus on the model's function rather than the details of a specific HDL
- Share model data among design groups; use simulation models to communicate design requirements between suppliers and customers; collaborate on model and design development
- Customize models with specialized capabilities; select functions and operations from libraries of model building blocks; build IP value by assembling model and building block libraries
- Target models to specific design environments; utilize ModLyng from within major EDA platforms including Cadence, Mentor Graphics, and Synopsys

Features

- Graphical interface containing model, equation, and topology editors
- Integrated global search for locating information anywhere in the model file
- Libraries of model building blocks including math, performance test, and assertion functions
- Built-in waveform plotter for verifying model performance
- Model, library, and object navigators to manage the entire model development process
- Dynamic pull-down menus populated with model-relevant information
- Verilog-A/AMS and VHDL-AMS language analyzers for importing existing HDL-based simulation models
- Verilog-A/AMS and VHDL-AMS code generators to output models targeted at a variety of popular simulators
- Ability to convert existing models from one language to another

Technical Specifications

- Platforms: Windows XP, Linux
- Import Languages: Verilog-A, Verilog-AMS, VHDL-AMS
- Export Languages: Verilog-A, Verilog-AMS, VHDL-AMS
- EDA Integrations: Cadence, Mentor Graphics, Synopsys

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Management Biographies

Martin Vlach, Ph.D. *Founder and Chief Executive Officer*



Dr. Martin Vlach, who was born and raised in Prague, Czechoslovakia, is the founder of Lynguent. In 1985, he helped start Analogy®, Inc., and for the 15 years he was there, he served as a member of its Board of Directors and as Chief Scientist. He was instrumental in attracting substantial angel investment to Analogy prior to its successful IPO and subsequent acquisition by Avant!® Corporation, and later by Synopsys, Inc. In the year prior to its acquisition, Analogy had over 200 employees and revenue of \$28M.

At Analogy, Martin conceived of and architected both the Saber® simulator and the MAST® hardware description language (HDL), which are still used worldwide to design a wide variety of systems, from complex mixed-signal (analog and digital) integrated circuits (ICs) to mixed technology consumer, automotive, and aerospace systems including electronic, hydraulic, mechanical, and optical components.

Martin holds a B.Math in Computer Science and M.A.Sc. and Ph.D. degrees in Electrical Engineering from the University of Waterloo in Ontario, Canada.

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Alan Mantooth, Ph.D. *Cofounder and Chief Scientist*



H. Alan Mantooth is a cofounder of Lynguent. He is also a Professor of Electrical Engineering at the University of Arkansas (UA) and the holder of the 21st Century Chair in Mixed-Signal IC Design and CAD, an endowed chair position. He received the B.S. (summa cum laude) and M.S. degrees in electrical engineering from the University of Arkansas in 1985 and 1987, respectively, and the Ph.D. degree from the Georgia Institute of Technology in 1990. He joined Analog (now a part of Synopsys, Inc.) in 1990 where he focused on semiconductor device modeling and the research and development of HDL-based modeling tools and techniques. Besides modeling, his interests include analog and mixed-signal IC design. In 1996, Dr. Mantooth was named Distinguished Member of Technical Staff at Analog. He has received numerous teaching, service, and research awards since returning to the UA. He was also selected to the Georgia Tech Council of Outstanding Young Engineering Alumni in 2002, and the Arkansas Academy of Electrical Engineers in 2006. Dr. Mantooth helped establish the National Center for Reliable Electric Power Transmission at the UA in 2005, for which he serves as director.

Dr. Mantooth has published over 100 refereed articles on modeling and IC design. He holds three patents on software architecture and algorithms for modeling tools and has others pending. He is co-author of the book *Modeling with an Analog Hardware Description Language* by Kluwer Academic Publishers and has served on several technical program committees for IEEE conferences. For example, he was the Technical Program Chair for the IEEE International Workshop on Behavioral Modeling and Simulation (BMAS) in 2000 and General Chair in 2001. He has served as a Guest Editor for the IEEE Transactions on Computer-Aided Design, the IET Computers and Digital Techniques, and as an IEEE Circuits and Systems Society Distinguished Lecturer. He is currently serving the profession as IEEE CAS representative on the IEEE Council on Electronic Design Automation and a member of the Power Electronics Society Advisory Committee as Chair of the Society's Standards Committee. Dr. Mantooth is a senior member of IEEE, a member of Tau Beta Pi and Eta Kappa Nu, and registered professional engineer in Arkansas.

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Management Biographies

Barbara Bakken

Cofounder and Chief Operating Officer



Barbara Bakken is a cofounder of Lynguent. She brings over 20 years of business experience in managing projects, programs, and teams. Throughout her career she has sought out opportunities to work in all areas of running a business. Barbara has a diverse background that ranges from conducting market research, developing and delivering corporate training programs, and managing employee relations programs. She has also served as a human resource officer for a super regional financial institution, an inside sales representative for construction estimating and project management software, and a customer relationship management application consultant to Fortune 500 companies.

Barbara also has experience managing software development projects both for web-based database driven applications and electronic design automation tools. She is experienced in formal government contract negotiations and government contract administration with the Department of Defense (DOD) and National Aeronautics and Space Administration (NASA) research programs and commercial contracts.

From 1996 to 2004 Barbara managed Analogy's Saber Simulator (Analog/Mixed-Signal Simulation) research and development team through an IPO and subsequent acquisitions by Avant! and Synopsys. Since 2004 Barbara has served as Lynguent's Chief Operating Officer with responsibilities over Finance and Accounting, Legal, Information Technology, Human Resource, Sales and Marketing, and Release Engineering.

She is a certified Project Management Professional (PMP) from the Project Management Institute. Additionally, she is a member of the International Coaching Federation and is working towards her Professional Coach Certification (PCC). Barbara holds a BA in Sociology from Humboldt State University and an MS in Industrial and Labor Relations Management (MILR) from the University of Oregon.

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Management Biographies

Patrick Dunn *Chief Financial Officer*



Pat Dunn has over 25 years of extensive experience in the areas of financial management and information system management. Pat began his career with KPMG, a "Big Four" CPA firm, gaining several years of valuable experience managing the audits of large, sophisticated clients in a variety of industries. Since leaving public accounting, Pat has gained an additional 20 years of experience in the areas of financial management and information system

management. Pat's private industry experience includes Nike®, where he was responsible for the SEC financial reporting, management reporting, budgeting, and financial analysis of 11 foreign subsidiaries. Pat was also a VP of Finance for a technology start-up company in the computer industry.

As a partner for 9 years with Financial Management Consulting Group, Pat acquired considerable experience as a Chief Financial Officer and Financial Consultant in redesigning the financial systems and computer operations of client companies, restructuring troubled companies to profitability, evaluating merger/acquisition opportunities, and in managing high growth companies.

Most recently Pat was the CFO and shareholder of Poly Concepts, Inc., a high growth company in the High Tech industry. Pat was responsible for the Finance, HR, and IT functions in this company. Poly Concepts was acquired in 2002 and Pat was the lead person in the negotiations and structuring of the transaction.

Pat currently serves on the Board of Directors and the Finance Committee of Catholic Charities in Portland, Oregon.

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Management Biographies

Jim Holmes

Vice President, Research and Applications Consulting



Jim Holmes is an analog and mixed-signal (AMS) modeling and simulation specialist with over 15 years of industry experience. His industry experience includes 13 years at Texas Instruments™, where he focused on validation and verification of over 40 SoC design projects, spanning consumer applications from servo control in hard disk drives to baseband processing in cellular phones. Jim supported AMS modeling activities worldwide at Texas Instruments' design centers, as well as its customer and contractor sites. He worked extensively with system and circuit engineering teams to create models for a wide range of processes, circuits, systems, and applications. He also developed key modeling methods that unified specification, design, and test activities across the globe. In 1999 Jim was elected to Group Technical Staff, and in 2004 to Senior Member Technical Staff, at Texas Instruments.

Throughout his career, Jim has delivered models spanning many hardware description languages (HDLs), including Spectre® HDL, Saber MAST, Spice-UDM, Eldo® FAS, VHDL-1076, VHDL-AMS 1076.1, Verilog, Verilog-A, Verilog-AMS, C, C++, and SystemC. His contributions to simulation modeling extend well beyond models and hardware description languages and into the ways they are created and exploited. Jim's techniques and best practices dramatically reduced the cost of AMS SoC validation. The model based flows he created at Texas Instruments unified design, test, and characterization teams spanning continents, time zones, product lines, and customers.

In April 2006 Jim joined Lynguent as Vice President of Research and Applications Consulting. He holds Bachelor's and Master's of Science degrees in Electrical Engineering from the University of Connecticut.

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Management Biographies

Ernst Christen

Vice President, Engineering



Dr. Ernst Christen joined Lynguent, Inc. in January 2008 as Vice President of Engineering. He has over 20 years of experience with all aspects of software design in the EDA industry, including software development, system analysis, engineering processes, project management, team management and working with customers to translate their needs into a successful delivery of product features.

Dr. Christen received a Diploma in Electrical Engineering and the Dr.sc.techn. degree from the Swiss Federal Institute of Technology, Zurich, Switzerland, in 1975 and 1985, respectively. From 1985 to 1987, he was with the Department of Electrical Engineering, University of Waterloo in Ontario, Canada, as a postdoctoral fellow. Since 1987 Dr. Christen has held various leading positions at Analogy, Inc., Avant! Corporation, and Synopsys, Inc. in the area of mixed-signal simulation technology, modeling technology and language design. He was the Principal Investigator for two DARPA contracts in the area of analog and mixed-signal hardware description languages awarded to Analogy, Inc.

As the vice-chair of the IEEE P1076.1 Working Group and a co-chair of its language design committee, Dr. Christen has made major contributions to the definition of IEEE Std. 1076.1 (VHDL-AMS). He continues to serve as chair of this group. He was also the lead developer of SAE standard J2748 - VHDL-AMS Statistical Analysis Packages. Dr. Christen holds three patents and is the author of over 40 publications. His interests include hardware description languages and mixed-signal multi-technology simulation.

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Management
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Eva Solarova

General Manager, Lynguent s.r.o. Prague



Eva Solarová has over 25 years of experience managing teams in architecture, specification, design, and implementation of information technology systems. She was head of the department of information technology at Czech Television until 2005. Eva also spent 2 years working in the Research Institute for Telecommunication and Electronics.

Eva joined Lynguent s.r.o. Prague in 2006. She graduated from Charles University in Prague with degrees in Math and Physics.

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