Oliver Downs, PhD

Chief Scientist,
Atigeo, LLC

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OVERVIEW

Dr. Oliver Downs is Chief Scientist at data intelligence innovator, Atigeo, where he is responsible for the research, development and deployment of advanced technologies in the Atigeo xPatterns platform, which enables Atigeo's portfolio companies and partners. His work is a combination of state-of-the-art machine learning and data mining algorithm application development and blue skies research in algorithm theory and design.

Oliver specializes in applying abstract analytical ideas from mathematical, physical and statistical science to problems in the real world; to date this has resulted in 21 US patents pending in the fields of Bayesian Prediction, Statistical Estimation, Outlier Detection, Real-Time GPS Data Processing and 4 granted patents in the fields of Quantum Optimization Algorithms, Dynamic Time Series Prediction, Location-based Data Probes and Anomaly Detection.

Oliver is not only an exceptional creator of technology; he is also an engaging communicator of that technology and a seasoned technology manager having grown the technical teams behind several successful startup companies.

His Erdös number is 3.

EMPLOYMENT HISTORY

CHIEF SCIENTIST (01/10-present)

CHIEF SCIENTIST, CTO & EVP, ENGINEERING (8/08-12/09)

Atigeo, LLC, Bellevue, WA (8/08 – present)

- *Technological and Scientific Leadership:*

  Responsible for the research, development and deployment of advanced technologies in Atigeo's platform, including advanced semantic modeling and dynamic ontology discovery, adaptive algorithms, neural networks, Bayesian reasoning, dimensionality reduction and clustering.

  Growth and management of the technical team responsible for both research and product development, including 23 engineers based in the US and Romania.

  Responsible for management of IP, technical publications, conferences and technical PR.

  Most senior technical executive of the company, interfacing with investors, board and major Global 50 customers and partners.

CHIEF SCIENTIST

Mindset Media, Redmond, WA/New York, NY (2/08 – 8/08)

- *Technological and Scientific Leadership:*

  Responsible for the mathematical and statistical science, architecture and design of the online prediction system that predicts attitudinal attributes of internet users based on a cookie-derived partial view of a user's online behavior.

  Growth and management of the technical team responsible for the entire product development process.

  Responsible for management of IP, technical publications, conferences and technical PR.

PRINCIPAL SCIENTIST

INRIX, Inc., Kirkland, WA (5/05 – 1/08)

- *Technological and Scientific Leadership:*

  Responsible for the mathematical and statistical science, architecture and design of the predictive and forecasting capabilities of Inrix traffic services platform, that has taken INRIX to cash flow positive and a ~$200m valuation.

  Responsible for the science and design of INRIX's nationwide 'Dust Network' deriving real-time traffic flow information from floating vehicles – a world-first.

  Invented much of and managed INRIX IP portfolio, including 13 patents pending and IP licensed from Microsoft Research.

  Member of Inrix's management team responsible for presenting INRIX technology at senior executive level in discussions with customers, investors and partners, and scientific/technical PR including conference, television and radio appearances.

CHIEF SCIENTIST

Analytical Insights, Inc., Redmond, WA (9/02 – Present)

- *Data Mining & Machine Learning:*

  Clients include AdReady, L1 Partners, IGT, Ryder, MSN, Microsoft Research, Farecast, Barnes & Noble, Novantas, Seattle Times and Apollo Data Technologies.

  Developed and deployed state-of-the-art predictive models of customer behavior for MSN, facilitating the development of advanced, data-driven, customer acquisition and retention strategy, using Microsoft SQL Server 2005

  Performed basic data-driven research to discover the underlying structure of contract-free monthly subscription behavior - the Standardized Lifecycle® view of subscription-based customer relationships provides unique insight for customer behavior prediction

- *Quantum Computation:*

  Help develop and invented some of the key IP behind the world's first quantum computing offering in partnership with D-Wave Systems, Inc.

- Directed customer acquisition and business development
- Built partner relationships to strengthen strategic positioning of business in marketplace

RESEARCH GRADUATE FELLOW

Microsoft Research, Redmond, WA (2/01 – 9/02)

- Theorized and implemented Quantum Tunneling Optimization, an efficient novel approach to Global Optimization, exploiting the theory of Quantum Physics.

  (Patent Granted)

RESEARCH INTERN

Microsoft Research, Redmond, WA (7/00 – 9/00)

- Researched the consistency of Gibbs Sampling for Dependency Networks, allowing their inclusion in SQL Server 2005 Analysis Services.

CONSULTANT

Bell Laboratories (Lucent Technologies), Murray Hill, NJ (7/98 – 5/99)

- Developed attractor neural network models of the occulomotor integrator in Goldfish.
- Developed novel Bayesian probabilistic modeling algorithm for Nonnegative Data, the Nonnegative Boltzmann Machine.

EDUCATION

Princeton University, Princeton, NJ

- Ph.D., Applied and Computational Mathematics. (7/00 – 10/04)
  - Thesis Title: Learning, Adaptation & Optimization: The Nonnegative Boltzmann Machine and the Tunneling Salesman Algorithm.
- M.A., Applied and Computational Mathematics. (9/98 - 7/00)

University of Cambridge, Cambridge, UK

- M.Sci., Experimental and Theoretical Physics. (9/94 - 6/98)
- M.A., Honorary. (2001)
- B.A., Experimental and Theoretical Physics. (9/94 - 6/98)

PATENTS

"QUANTUM MECHANICAL MODEL-BASED SYSTEM AND METHOD FOR GLOBAL OPTIMIZATION"
Inventors: Oliver B. Downs, Hagai Attias, Christopher J. C. Burges & Robert L. Rounthwaite
US Patent Number: 7,398,162 Granted 07/08/2008

"IDENTIFYING UNREPRESENTATIVE ROAD TRAFFIC CONDITION DATA OBTAINED FROM MOBILE DATA SOURCES"
Inventors: Oliver B. Downs, Craig H. Chapman, Robert C. Cahn & Jesse S. Hersch
Application Number: 11/431,980 Filed 05/11/2006

"DYNAMIC TIME SERIES PREDICTION OF FUTURE TRAFFIC CONDITIONS"
Inventors: Oliver B. Downs, Craig H. Chapman & Alec Barker
Application Number: 11/367,463 Filed: 03/03/2006

"ASSESSING ROAD TRAFFIC SPEED USING DATA OBTAINED FROM MOBILE DATA SOURCES"
Inventors: Oliver B. Downs, Craig H. Chapman, Robert C. Cahn & Jesse S. Hersch
Application Number: 11/432,603 Filed: 05/11/2006

"ASSESSING ROAD TRAFFIC FLOW CONDITIONS USING DATA OBTAINED FROM MOBILE DATA SOURCES"
Inventors: Oliver B. Downs & Craig H. Chapman
Application Number: 11/438,822 Filed: 05/22/2006

"FILTERING ROAD TRAFFIC CONDITION DATA OBTAINED FROM MOBILE DATA SOURCES"
Inventors: Oliver B. Downs, Craig H. Chapman, Alec Barker, Mitchel A. Burns & Scott R. Love
Application Number: 11/444,998 Filed: 05/31/2006

"OBTAINING ROAD TRAFFIC CONDITION DATA FROM MOBILE DATA SOURCES"
Inventors: Oliver B. Downs & Craig H. Chapman
Application Number: 11/473,861 Filed: 06/22/2006

"RECTIFYING ERRONEOUS ROAD TRAFFIC SENSOR DATA"
Inventors: Oliver B. Downs, Alec Barker & Craig H. Chapman
Application Number: 11/540,342 Filed: 09/28/2006

"DETECTING ANOMALOUS ROAD TRAFFIC CONDITIONS "
Inventors: Oliver B. Downs, Alec Barker, Robert C. Cahn, Wayne Stoppler, Craig H. Chapman
Application Number: 11/556,648 Filed: 11/03/2006

"DISPLAYING ROAD TRAFFIC CONDITION INFORMATION AND USER CONTROLS"
Inventors: Alec Barker, Todd Asher, Mitchel A. Burns, Robert C. Cahn, Craig H. Chapman, Oliver B. Downs
Application Number: 11/556,670 Filed: 11/03/2006

"GENERATING REPRESENTATIVE ROAD TRAFFIC FLOW INFORMATION FROM HISTORICAL DATA"
Inventors: Oliver B. Downs, Jesse S. Hersch & Craig H. Chapman
Application Number: 60/838,761 Filed: 08/18/2006

"DETERMINING ROAD TRAFFIC CONDITIONS USING DATA FROM MULTIPLE DATA SOURCES"
Inventors: Craig H. Chapman, Oliver B. Downs, Kush Parikh, Robert C. Cahn, Jesse S. Hersch

"IDENTIFYING USER VISITS TO DETERMINED LOCATIONS OF INTEREST"
Inventors: Oliver B. Downs, & Darren E. Vengroff
Application Number: 60/914,556 Filed: 04/27/2007

"LOCATION-BASED INFORMATION DETERMINATION"
Inventors: Darren E. Vengroff & Oliver B. Downs
Application Number: 60/911,627 Filed: 04/13/2007

“DETERMINING RELEVANT INFORMATION FOR DOMAINS OF INTEREST”
Inventors: Oliver B. Downs, Michael Sandoval, Claudiu A. Branzan, Vlad M. Iovanov, Sopurkh S. Khalsa, Radu I. Bisca & Catalin T. Milos
Application Number: 12/392,933 Filed: 02/25/2009

“ELECTRONIC PROFILE DEVELOPMENT, STORAGE, USE AND SYSTEMS THEREFOR”
Inventors: Michael Sandoval, David B. Boardman & Oliver B. Downs
Application Number: 12/334,389Filed: 12/12/2008

“ADVERTISING SELECTION AND DISPLAY BASED ON ELECTRONIC PROFILE INFORMATION”
Inventors: Mark J. Kapczynski, Michael Sandoval, Oliver B. Downs & David B. Boardman
Application Number: 12/334,416 Filed: 12/12/2008

“ELECTRONIC PROFILE DEVELOPMENT, STORAGE, USE AND SYSTEMS FOR TAKING ACTION BASED THEREON”
Inventors: Michael Sandoval & Oliver B. Downs
Application Number: 12/392,908 Filed: 02/25/2009

“PLATFORM FOR DATA AGGREGATION, COMMUNICATION, RULE EVALUATION, AND COMBINATIONS THEREOF, USING TEMPLATED AUTO-GENERATION”
Inventors: Michael Sandoval & Oliver B. Downs
Application Number: 12/392,900 Filed: 02/25/2009

“PROVIDING RECOMMENDATIONS USING INFORMATION DETERMINED FOR DOMAINS OF INTEREST”
Inventors: Oliver B. Downs, Michael Sandoval, Claudiu A. Branzan, Vlad M. Iovanov& Sopurkh S. Khalsa
Application Number: 12/636,630 Filed: 12/11/2009

PUBLICATIONS

The Nonnegative Boltzmann Machine,
O.B. Downs, D.J.C. MacKay and D.D. Lee,
Advances in Neural Information Processing Systems 12, pp428-434
S.A. Solla, T.K. Leen, K.-R. Mueller, eds., MIT Press, 2000.

High-temperature expansions for learning models of nonnegative data,
O.B. Downs
Advances in Neural Information Processing Systems 13, pp465-471
T.K. Leen, T.G. Dietterich, V. Tresp, eds., MIT Press, 2001.

Analytical Reflective Slice Sampling: The Nonnegative Boltzmann Machine,
O.B. Downs
Invited illustration of Neal's *Slice Sampling*, Annals of Statistics 31:3, June 2003.

The Tunnelling Salesman: Truncated Variational Approximations for Quantum Mechanical Global Optimization, *Patent Granted*
O.B. Downs, H. Attias C.J.C. Burges & R. Rounthwaite
Microsoft Research Technical Report MSR-TR-2002-100, October 2002.

AWARDS

2007 Breakthrough Technology of the Year – Washington Software Alliance
2000-2002 Microsoft Research Graduate Fellowship
1999 & 2000 NIPS Foundation Travel Award.
1998-1999 Procter Fellowship, Princeton University, USA.
1998 Mary Lucking Prize
"For student of Fitzwilliam College with the most exceptional record of academic achievement in his Cambridge Career."
1998-1999 Senior Scholar of Fitzwilliam College, Cambridge University
Highest Classed Physicist, Fitzwilliam College, in Natural Sciences Parts IA, IB, II and III.
Elected to the Rawlins, Donald-Walker and Clough Scholarships of Fitzwilliam College consecutively.
1995, 1996, 1997, 1998 - Fitzwilliam College Prizes for academic achievement
1994-1995 Degree Sponsorship from Roke Manor Research.
1994 Sir Peter Emery Cup
"For outstanding academic achievement at Exmouth Community College."
1994 British Physics Olympiad Competition - Silver Award
Within top one hundred UK physicists in age group.

HOBBIES & INTERESTS

Waterpolo - Fitzwilliam College Team. (1994 to 1998).
Motor Racing (Porsche Club of America), Sailing (ASA Level II Certified, June 2001), Swimming (particularly open water), Violin - since the age of three years old.