

# Karl-Heinz Ott

Dr. sci. Biochemistry and Biophysical Chemistry

Belmont, MA 02478

Combines vision, diligence, and pragmatism to  
reduce disruptive innovations to practice  
Communicates openly in cross-functional, matrixed teams and  
across all levels of an organization

## Innovative bioinformatics to address unmet medical needs

### Qualifications

Quickly identify gaps and their solutions

Communicate with all levels across an organization

Understand biopharma discovery & development

Combine in-depth technology expertise with therapeutic area knowledge

Develop scalable, reliable and lean IT solutions for R&D

Manage collaborations, alliances, projects, and data

Deliver reliable, high quality IT and bioinformatics solutions with IT platforms, mining & visualization

Excel with thorough due-diligence of business and partnering opportunities

Implement efficient computational and experimental pipelines

Help wet-labs improve their processes

Provide preclinical and clinical statistics support

Ensure knowledge transfer

### About

Contributed innovative BioIT for 20+ years serving small and large Biotech.

Earned strategic leadership positions in teams, departments, and businesses.

Advanced drugs, biologics and biomarkers from early discovery to Phase II.

Implemented, improved and integrated experimental and computational methods and knowledge mining to generate decision critical information that led to new therapeutics. Succeeded where others had given up.

Strategically transformed and diligently managed a large, multi-year alliance portfolio building strong collaborative relationships to create a highly effective and impactful platform for new generations of genetic models.

Supported ENC's and INDs, worked under GLP.

Understanding biology, chemistry, IT, and business aspects of R&D.

Co-created and led Metarrest, a public-private funded biotech, to a Proof-of-Concept for a nanoparticle immunoncology therapeutic.

Patents and publications in bioinformatics, metabolomics, expression profiling, statistical methods, artificial intelligence, structural biology.

### Specialties

Translational Medicine

Systems Biology

Biomarkers

Diagnostics

Therapeutics

Immuno-oncology

Oncology Immunology

Neuroscience Met/ CV

Agricultural Sciences

Nutraceuticals

'omics

Genomics

Genetic Models

NextGen Sequencing

IT

Biostatistics

Bioinformatics

Computational Biology

Artificial Intelligence

Data Management

Big Data Analytics

Custom Software

Visualization

Business Development

Scientific Consulting

Due diligence

Data Science

## Professional Experience and Education

- 2011 - Scientific and Business Development Consultant at Expertbioinformatics, LLC**  
Supported Customers with Biostatistics for Phase II clinical research  
Developed custom methods, infrastructure, and software, designed and conducted studies. Worked in Nextgen sequencing, epigenetics, screening  
Delivered Target and Disease Dossiers; Data analyses for 'omics and screening  
Worked with Medtech and Health-IT companies to enter the US market  
Created IT infrastructure strategy, and implemented a scalable global IT framework for an international Biotech company
- 2012 - Business Development and Bioinformatics at Generation Biotech, LLC**  
Nextgen Sequencing, custom software development, study design and analysis, method innovation, client support, product development
- 2012 – 2014 Managing Director at Metarrest GbR, Germany**  
Invented and reached Proof-of-Concept for Nanoparticle-based Therapeutics;  
Obtained significant 2-year public/private research funding
- 2000 – 2011 Principal Scientist, Applied Genomics, Bristol-Myers Squibb Co., Princeton, NJ**  
Oncology, Immunoncology, Neuroscience Liaison  
Progressed leads through improvements and tight integration of experimental and computational methods, integrated data capture and quality control, and innovative data analysis and visualization of complex biological data  
Managed and strategically transformed alliance portfolio  
Contributed to and led teams for biomarker identification and validation, disease model development, and target validation efforts.  
Discovered and validated preclinical and clinical safety and efficacy biomarkers that enabled the program transition into the clinic.  
Developed and published novel –Omics and statistical methodologies,
- 1993 – 2000 Head, Bioinformatics, American Cyanamid Company, Princeton, NJ**  
Structural Biology, NMR, Metabolomics and AI screening methodology, plant genomics, Multiple patents and publications
- 1991 – 1993 Postdoctoral Researcher with Prof. B. Meyer. Complex Carbohydrate Research Center, University of Georgia, Athens, Georgia**  
Development of Force Fields for Glycoproteins, Ab initio calculations
- 1988 – 1991 Ph.D. in Biochemistry in the laboratory of Prof. Rüterjans, Institute for Biophysical Chemistry, University of Frankfurt, Germany**
- 1982 – 1987 Diploma in Chemistry, University of Frankfurt, Germany**

## Achievements

### Biotech Development

Invented a novel therapy to prevent metastasis. -  
Successfully started biotech and executed research and development plans  
Developed computational platforms to enhance value for Biotech  
Advised and matched Medtech startups entering the US market  
Performed due diligence and QC tasks at a number of biotech companies.

### Disease Targets for Immunology and Oncology

Generated decision critical information to identify new therapeutic targets for immunology and oncology through knowledge mining, analysis of gene expression and proteomics data, pathway modeling, and biochemical interpretation.

Identified and managed creation of a number of mouse models that were critical for the development and validation of humanized antibodies.

Developed an oncology/immunology research strategy and negotiated its implementation to improve alignment of research efforts and cross-functional collaboration and that translated directly into several novel research programs.

Contributed to the advancement of 3 drugs into the clinic by identifying the mechanisms of toxicity of lead compounds.

### Biomarkers

Contributed significantly to developing predictive and safety biomarkers and biomarker panels for neuroscience, oncology, immunology, and metabolic diseases that successfully translated into the clinic or helped to improve safety or efficacy of drug candidates.

Worked with preclinical and clinical scientists to create biomarker strategies and to identify, validate, and employ two safety biomarkers.

Developed and executed on clinical study protocols, statistics, reports

Analysis of 'omics, NGS, and other experiments, pathway and functional analysis and comprehensive biological interpretations.

Executed large-scale data integration, visualizations development and systems biology analysis ('omics, CNV, SNP, Next-gen sequencing).

### Bioinformatics

Introduced disruptive experimental approaches for drug discovery and through innovative use of statistical methods.

Correlated 'omics data with phenotypic, preclinical and clinical outcome using advanced data mining, multivariate statistics and neural networks.

Build hardware and software platform for NGA analysis

Extensive computational training in data and knowledge management. Very strong data visualization, statistics and pattern recognition skills.

Develop	Served as a mentor, trainer, and consultant to other scientists to help them develop new skill sets and achieve personal growth goals.
Innovate	Developed management strategies for a reorganization of bioinformatics and genomics support and services.
Lead	First or corresponding author of highly rated publications and over 60 presentations at scientific meetings covering metabolomics, bioinformatics, NMR and mass spectroscopy, molecular modeling and novel methods.
	Co-inventor for several commercially valuable patents.
	Lead the organization of a large company conference.
Alliance Management	<p>Strategically transformed and effectively managed several genetically modified animal alliances by fostering an open and productive collaboration and ensuring highest value and timely execution by focusing on goals and attention to detail.</p> <p>Evaluated and implemented key technology innovations with external partners.</p> <p>Provided due diligence evaluations that resulted in decisions on technology, knowledge and software acquisitions.</p>
Transcriptomics	Conceptualized and established a leading metabolomics program that achieved major impact on discovery and development programs. First in industry to include metabolomics safety and biomarker studies as part of regulatory filings.
Metabolomics	Invented, implemented and patented Artificial Intelligence analysis of metabolome screen for compound libraries
Proteomics	Performed extensive number of expression profiling analysis, utilizing pathway and functional analyses to achieve comprehensive biological interpretations.
	Supported immunology target and marker identification through a quantitative proteomics effort on dendritic cells.

## Skills and Languages

Fluent in English and German, spoken and written. Knowledge of spoken Spanish.

Proficient in data management and databases, data visualization, multiple programming and statistics languages, development on Linux and Windows Systems platforms. (SQL, R, S-Plus, Perl, C, VBA, Excel automation, Web development,...)

Knowledge of experimental analytical methodologies NMR, MS, -omics, NGS, RNASeq, in vitro and cell-based screening, genetically modified animals, biochemistry, nanoparticles,...

Patenting, value oriented BD approaches, due diligence, grant writing

## Publications

[Publications in peer reviewed journals](#) span metabolomics, and expression profiling, statistical methods, pattern recognition and use of artificial intelligence, structural biology and computational chemistry.

Several patent applications have been filed. (<http://expertbioinformatics.com/otk/publications/patents/>)

Over 60 presentations have been presented or co-authored (<http://expertbioinformatics.com/otk/publications/talks>)

1. Schweitzer, B, Ott, K-H, Humor. Volume 29, Issue 3, Pages 413–438 (2016)
2. Ott, K-H and Dapprich, J. "Removing Cells from an Organism" Patent Application 13/740,817 (2013)
3. Aranibar, N., Bennett, J., Tomlinson, L., Horvath, J., Tirmenstein, M., Cosma, G., Ott, K-H. *Progressive Muscle Toxicity and Evidence of Mitochondrial Dysfunction in Dogs Treated with Ibipinabant, a Cannabinoid-1 Receptor Antagonist*. Submitted
4. Tomlinson, L., Tirmenstein, M., Janovitz, E., Aranibar, N., Ott, K-H., Bennett, M., Kozlosky, J., Patrone, L., Moyer, C., Achanzar, W., Augustine, K., Brannen, K., Carlson, K., Charlap, J., Dubrow, K., Kang, L., Marthaler, L., Panzica, J., Flint, O., Moulin, F., Zhang, H., Cosma, G. *Non-Pharmacology-Based CB-1 Antagonist-Induced Striated Muscle Toxicity and Ethylmalonic-Adipic Aciduria in Beagle Dogs*. *ToxSci* **2012**
5. Posy, S., Hermsmeyer, M., Vaccaro, W., Ott, K-H, Trainor, G, Loughney, D., Johnson, S., Todderudd, G., Lippy, J. *Trends in Kinase Selectivity: Insights for Target Class-Focused Library Screening*, *Journal of Medicinal Chemistry* 54, no. 1 **2011**
6. Ji, R., Ott, K-H., Yordanova, R., and Bruccoleri, R. *FDR-FET – an optimizing gene set enrichment analysis method*. *Advances and Applications in Bioinformatics and Chemistry*, 1:4, 37-42, **2011**
7. Aranibar, N., Bhaskaran, V., Ott, K-H., Vassallo, J., Nelson, D., Lecureux, L., Gong, L., Stryker, S., Lehman-McKeeman, L. *Modulation of ascorbic acid metabolism by cytochrome P450 induction revealed by metabolomics and transcriptional profiling* *Mag. Res. Chem.* Dec;47 Suppl 1:S12-9, **2009**
8. Ji, R., de Silva, H., Jin, Y., Bruccoleri, R., Cao, J., He, A., Huang, W., Kayne, P., Neuhaus, I., Ott, K-H., Penhallow, B., Cockett, M., Neubauer, M., Siemers, N., Ross-Macdonald, P. *Transcriptional Profiling of the Dose Response: A More Powerful Approach for Characterizing Drug Activities*. *PLoS Comput Biol* 5(9): **2009**
9. Warrack, B., Hnatyshyn, S., Ott, K-H., Reily, M., Sanders, M., Zhang, H., Drexler, D. "Normalization Strategies for Metabonomic Analysis of Urine Samples". *J. Chromatography B*, **877**, 547, **2009**
10. Davison, D., Feder, J., Ott, K-H. *Novel Polynucleotides Encoding the Human Citron Kinase Polypeptide*, **US 7,326,781 B2**, **2008**
11. Ott, K-H., Aranibar, N. "Metabonomics in Discovery and Development." From: *Methods in Molecular Biology*, vol. 358: *Metabolomics: Methods and Protocols* Edited by: W. Weckwerth Humana Press Inc., Totowa, NJ. **2006**
12. Aranibar, N., Ott, K-H., Roongta, V., Mueller, L.: "Metabolomic analysis using optimized NMR and statistical methods". *Analytical Biochemistry*, 355, 62-70, 2006
13. Ott, K-H., "Summary of Advances in Metabolic Profiling," London, 2006. Thomson Int. Investigational Drugs Database (IDdb) **2006**
14. Ott, K-H., Aranibar, N., Singh, B., Stockton, G. W. "Metabonomics classifies pathways affected by bioactive compounds." *Phytochemistry*, 62, 971-983, **2003**. (>100 citations)
15. Kakefuda, G., Ott, K-H., Kwagh, J-G., Stockton, G.W. *Structure Based Designed Herbicide Resistant Products* United States Patent 6,576,455 issued **2003**.

16. Davison, D., Feder, J., Ott, K-H. Provisional Patent Application. **2002**
17. Aranibar, N., Singh, B., Stockton, G. W., Ott, K-H. "Automated Mode-of-Action Detection by Metabolic Profiling" Biochemical and Biophysical Research Communications, 286(1), 150, **2001**.
18. Aranibar N., Ott K-H., Stockton, G.W. "Metabolic profiling for identifying a metabolic state of an organism, e.g. gene alterations comprises analyzing recognition system data of observed metabolites from organisms by spectroscopic or chromatographic techniques." WO 200257989-A2, WO 2002EP367-A, US 2001262531 P **2001**
19. Weiss, C., Sturmer, S., Reiner, A., Ott, K-H. "Isolation of Plant Secreted and Membrane Proteins using Yeast Genetic Screen." Patent Application, Filed, **2000**.
20. Kakefuda G.; Langevine C.; Ott K.; Rodaway S.; Sarokin L. "Novel methods for identifying tryptophan biosynthesis, comprising, e.g. adding a test compound to an in vitro assay, useful for identifying herbicidal compounds with novel mechanisms of action" WO 200046394 , WO 2000US3188 , AU 200034846 , EP 1144672 , EP 2000913389 , WO 2000US3188 , BR 20007993 , WO 2000US3188 , CN 1371428 , CN 2000804650 , US 99119208 **1999**
21. Kakefuda, G., Kwagh J. G., Ott K-H., Stockton, G. W. "Structure-based Design Herbicide-Resistant Products" WO 9633270 , AU 9655758 , EP 821729 , NO 9704803 , CZ 9703317 , US 5853973 , JP 11504213 , HU 9900852 , US 5928937 , MX 9708079 , BR 9604993 , NZ 307012 , NZ 500281 , NZ 502491, MX 201696 **1998**. U.S. Patent 5,853,973, **1998**.
22. Ott, K-H., Kwagh, J. G., Stockton, G. W., Sidorov, V., and Kakefuda, G. "Rational Design of Herbicide Resistant Crops by Structure Modeling and Site-Directed Mutagenesis of Acetohydroxyacid Synthase", Journal of Molecular Biology, **1996**, 263(2), 359-368. (Over 60 citations)
23. Ott, K-H. and Meyer, B. "Parametrization of the GROMOS Force Field for Oligosaccharides and Assessment of the Efficiency of Molecular Dynamics Simulations", Journal of Computational Chemistry, **1996**, 17(8), 1068-1084. (over 30 citations)
24. Ott, K-H. and Meyer, B. "Molecular Dynamics Simulations of Maltose in water". Carbohydrate Research, **1996**, 281, 11-31. (over 30 citations)
25. Pieper, J., Ott, K-H., and Meyer, B. "Stabilization of the T1 Fragment of Glycophorin A<sup>N</sup> Through Interactions with N- and O-linked Glycans", Nature Structural Biology, **1996**, 3(3), 228-232.
26. Ott, K-H., Rüterjans, H. "Solution Structure of the LexA Operator Sequence", Quarterly of Magnetic Resonance in Biology and Medicine, **1995**, II(3) 195-208.
27. Ott, K-H., Rüterjans, H. "The Structure and Dynamics of the LexA Recognition Sequence. A MD Study Based on NMR Data.", Quarterly of Magnetic Resonance in Biology and Medicine, **1995**, II(3), 209-224.
28. Ott, K-H., Becker, S., Gordon, R. D., and Rüterjans, H. "Solution Structure of  $\mu$ -Conotoxin GIIIA Analyzed by 2D-NMR and Distance Geometry Calculations", FEBS Letters, 1991, 278:160-166.
29. Ott, K-H. "Solution Conformations of the SOS Operators of E. coli using NMR Spectroscopy and Molecular Dynamics Simulations", Ph.D. Thesis, University of Frankfurt, Germany, **1991**.
30. Ott, K-H. "NMR Investigations of Oligonucleotides", Diploma Thesis, University of Frankfurt, Germany, **1987**.

## Awards

- Awarded €330,000 research grant to develop nanoparticle based therapeutics (2012-2014)
- R&D Award for Enabling Contributions to a Successful Kinome Screening Effort, 2010
- Scientific Excellence Award for Innovation in Clinical Metabolomics, 2008
- High-ranking Triumph Award for Metabolomics work leading to an IND, 2006
- PRI Star Award for Alliance Management, 2006
- Session Chair, Advances in Metabolic Profiling, London 2006
- Triumph Award for Implementation of Metabolomics at BMS, 2005
- PRI Star Award for Metabolomics Data Integration Interface, 2004
- Triumph DOC Award for Genomic Dossiers, 2003
- Applied Biotechnology Collaboration Award, 2003
- Customer Satisfaction Award for Pioneering Work in Bioinformatics, 1999.
- Customer Satisfaction Award for Crystallographic Analysis of a Protein-Inhibitor Complex, 1998.
- Safety Hawk Award from American Cyanamid Company, 1998.
- Winner of prestigious Scientific Publication Award, given by American Cyanamid Company upon recommendation by an outside panel, 1997.
- Earned the highly prestigious Scientific Achievement Award from American Cyanamid Company for a Rational Design of Herbicide Resistant Plants using Protein Modeling and Genetic Engineering, 1996.
- Elected Chairman and Program Editor of the Organization Committee for the American Home Products International Analytical Conference with about 250 individual contributors, 1995.
- Research grant awarded from the German Academic Exchange Service (DAAD), 1991 - 1992.