

# ANDREW K. SWANSON

## *Executive Summary*

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### ***Leader with Extensive Experiences Developing and Deploying Science and Engineering Innovations***

- ✓ Proven Leader and Team Builder
- ✓ Strong in CleanTech, Sustainability, Process Engineering, Biotech & Industrial Fermentation, Natural and Environmental Resources
- ✓ Demonstrated Scale-up, Technology Transfer, and R&D/Manufacture Interfacing
- ✓ Skilled Public Presenter, and Accomplished Grant Writer/ Fund Raiser (>\$60 M)

## ***Professional Experience***

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- CEO	2013-present
- PROGRAM DIRECTOR & DISTIGUISHED FELLOW	2012-2013
Verschuren Centre for Sustainability in Energy and the Environment Cape Breton University, Sydney, NS, Canada (Industrial Liaison, Fund Raising, Program Development, R&D Facility Operations)	

- Led and managed staff (12) through R&D facility start-up transition to full operations
- Pursued commercial relations, secured R&D contracts, and developed external support for applied research projects through marketing and networking
- Managed budgets of existing projects, grants, meeting all milestones and deliverables
- Balanced a \$3 M operational budget for centre through new contracts
- Developed strategic technical, financial and logistical evaluation documents
- Represented university at government, commercial and academic engagements

<b>CONSULTANT</b>	2012
Energy Focus Inc., Solon, OH, USA (Energy Efficiency, Environmental Sensor Design and Electronics Manufacturing)	

- Assisted an energy efficiency electronics manufacturer in grant writing (\$1 M secured), and IP valuation
- Developed specialized trade recruiting strategies for a company
- Project management of company contracted DOD R&D program (nuclear radiation tolerance and hardening of electronic components for military applications)
- Developed technical, financial and logistical evaluation documents for client

<b>-VICE PRESIDENT (RESEARCH AND DEVELOPMENT)</b>	2009-2012
<b>-DIRECTOR (SCIENCE AND ENGINEERING)</b>	2008
<b>-FACILITY MANAGER</b>	2008-2012
Phycal Inc., Highland Heights, OH, USA (Biofuels, Carbon Sequestration, Feeds, Fertilizers, Waste Water Treatment)	

- Led a biofuel company's pilot site R&D program in: Process Design and Technology Evaluation; Water Treatment/Recycle & Dewatering; Microbial (algae, yeast) Fermentation Design & Operation; Starch & Lignocellulosic Enzymatic Processing; Thermo-Chemical Biomass Conversion (Hydrous Pyrolysis, Fast Pyrolysis); Biochemical Extraction and Purification; Anaerobic Digestion; QC Analytics of Products (ethanol, diesel, JP-8, NG, bio-oil, pigments, proteins, carbohydrates, char); Molecular Biotechnology
- Led, designed and optimized a company's 11 unit process into an integrated pilot-scale production line
- Managed science/engineering operations and budgeting of a company's 12,000 sq. ft. mixed laboratories, offices, and light manufacturing facility
- Co-managed contract and external service providers
- Invented, co-managed development and protection of a company's Intellectual Property (IP)
- Acted as a company's technical representative to strategic and technological partners, investors (energy, food and transportation majors, private equity funds, venture capitalists), and governmental agencies
- Product market development and assisted in securing product off-take agreements
- Managed recruiting, evaluations and strategic resourcing of a company's (>50) scientists and engineers (30+ direct reports)
- Identified, co-wrote, coordinated execution and reporting of multiple competitive external grants (co-PI for \$57,000,000 from DOE, DOD, Ohio, Hawaii, NSF)

<b>CEO and Co-Founder</b>	2007-2008
Limnos Energy LLC, Kirtland, OH, USA (Aquaculture Feed; Biodiesel)	

- Led an algal-based, high rate pond, bioprocess company's 5-acre \$300,000 pilot site construction
- Obtained construction and utility permits from municipality, public utilities, and state environmental offices through disclosures, public hearings, presentations, and on-site inspections
- Developed civil engineering designs, and specialty technologies
- Negotiated off-take agreements with strategic partners
- Developed construction plans, budgets, and equipment procurement schedules
- Developed targeted marketing data and cost modeling for company
- Represented company to potential investors, and governmental parties
- General oversight of administrative and construction workers

**CONSULTANT**

2007

HydroPartners LLC, Cleveland, OH, USA

(Alternative Energy, Agriculture and Commodity Market Research)

- Assisted an investment company in its due diligence of technologies and markets of a proposed \$4,000,000 integrated agriculture refining and biofuel processing facility for Brazil
- Developed technical, financial and logistical evaluation documents for client

**ASSISTANT PROFESSOR**

2003 - 2007

Case Western Reserve University, Cleveland, OH, USA

(Global Change Biology; Aquatic Biology)

- Led and trained scientists and engineers (20) in molecular ecophysiology and biochemistry projects
- Organized technical symposia attended by 200+ researchers, governmental agencies, NGOs, and members of public
- Developed novel course offerings (Global Change Biology) for a university
- Established and managed grant supported research budgets (\$225,000) supporting laboratory operations
- Communicated complex information to peer-reviewed journals, public forums, private foundations and undergraduate/graduate classes
- Chaired/managed departmental committees responsible for exceeding yearly target student recruitment numbers by 25%

**RESEARCH SCIENTIST**

2002

University of Western Ontario, London, ON, Canada

(Fungal Biology)

- Scientist for a fungal biochemistry and physiology research program
- Developed novel protocols, peer-reviewed research articles and developed competitive grant proposals

**RESEARCH SCIENTIST**

2000-2002

Agriculture &amp; Agri-Food Canada, London, ON, Canada

(Molecular Biology; Secondary Metabolism; Agriculture Crop Science)

- Agricultural Scientist and Project Manager for a governmental research in Biochemistry and Functional Genomics of Plant Secondary Metabolism and Metabolic Pathway Discovery
- Co-developed molecular and computer methodologies to accelerate hi-through-put gene identification and annotation
- Co-developed research articles, grants, presentations, and patents
- Co-managed project workers (3), assisted in hiring and community outreach programs

## Education

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<b>Ph.D.</b> Biological Sciences, Simon Fraser Univ., Burnaby, BC, Canada	2000
<b>M.S.</b> Plant & Environmental Science, Univ. of Western Ontario, London, ON, Canada	1995
<b>B.S. (Honors)</b> Biology, Univ. of Western Ontario, London, ON, Canada	1992

## Notables

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- ✓ 100+ technical publications and presentations
- ✓ 5 US patents/patent applications
- ✓ Secured \$60+ M in competitive grants/fund raising
- ✓ Language Skills in English and French
- ✓ International Work Experiences: United States, Israel, India, South Korea, Guyana, Brazil
- ✓ Peer Reviewer for Bioresource, Algal Research, Canadian Journal of Botany, Journal of Phycology, Journal of Plant Physiology and Biochemistry; European Journal of Phycology

## Relevant Publications and Patents/Published Applications

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- Swanson AK, Postier BL, Sayre RT. Algal Lipid Production. 2012. PCT US2012/0088279.
- Richards G, Swanson AK, Park J. 2012. Carbon management system. PCT/US12/24363
- Postier B, Swanson AK, Abad M, Lauderdale GW, Kessler B, Allnutt FCT. 2011. Methods for improved mixed trophic state algal culture. US Provisional 61442261
- Allnutt FCT,... Swanson AK. 2011. Biosecure genetically modified algae. PCT US2011/43009
- S.Carrino-Kyker, A.K. Swanson, D.J. Burke. 2011. Changes in eukaryotic microbial communities of vernal pools along an urban-rural land use gradient. *Aquatic Microbial Ecology*. 62:13-25
- Lane CD, Swanson AK, Brister AB, Allnutt FCT. 2009. Biofuel production from algae. PCT WO 2010/132414.
- A.K.Swanson, F.C.T.Allnutt, R.Sayre. 2009. Non-destructive continuous extraction of microbial neutral lipids under simulated field conditions. ASPB & PSA Program Guide (<http://abstracts.aspb.org/pb2009/public>) pp.170
- S.Carrino-Kyker, A.K.Swanson. 2008. Temporal and spatial patterns of eukaryotic and bacterial communities found in Ohio vernal pools as determined by denaturing gradient gel electrophoresis. *Applied and Environmental Microbiology*.74:2554-2557

- A.K.Swanson, C.Fox. 2007. Altered kelp (Laminariales) phlorotannins under joint CO<sub>2</sub> and UVR treatments can influence associated intertidal food-webs. *Global Change Biology* 13:1696-1709
- C.Fox, A.K.Swanson. 2007. Nested-PCR detection of putative microscopic lifestages of Laminarian macroalgae and comparisons with macroscopic forms along intertidal height gradients. *Marine Ecology Progress Series* 332:1-14 \*Feature Article
- S.Kyker, A.K.Swanson. 2007. Seasonal physicochemical characteristics of thirty northern Ohio temporary pools along gradients of GIS-delineated human land-use. *Wetlands* 27:749-760
- A.K.Swanson, S.Hrinda, J.B.Keiper. 2007. Laboratory assessment of the effects of altered atmospheric carbon dioxide on green algae phenolics and caddisfly (Trichoptera) herbivore growth and survival. *Freshwater Ecology* 22:49-60
- M.Bačkor, A.K.Swanson, D.Fahselt. 2006. Chlorophyll *a* fluorescence and photosynthetic pigments composition of three *Umbilicaria* lichen species in relation to cliff light microenvironment. *Journal of Hattori Botanical Laboratory* 98: 297-306
- A.Richman\*, A.K.Swanson\*, T.Humphrey, R.Chapman, B.McGarvey, R.Pocs, J.E.Brandle. 2005. Functional genomics uncovers three glucosyltransferases responsible for the synthesis of major sweet glucosides of *Stevia rebaudiana*. *The Plant Journal* 41:56-67 (\* co-first authors, Feature Article)
- J.E. Brandle, A.Richman, A.K.Swanson, B.P.Chapman. 2002. Leaf ESTs from *Stevia rebaudiana*: A resource for gene discovery in diterpene synthesis. *Plant Molecular Biology* 50: 613-622
- A.K.Swanson, L.D.Druehl. 2002. Induction, exudation and potential UV protective role of kelp phlorotannins within coastal waters. *Aquatic Botany* 1578: 1-13
- A.K.Swanson, L.D.Druehl. 2000. Differential meiospore size and tolerance of ultraviolet light stress within and among kelp along a marine depth gradient. *Marine Biology* 136: 657-664
- A.K.Swanson, D.Fahselt, D.Smith. 1996. Phenolic levels in *Umbilicaria americana* in relation to enzyme polymorphism, altitude and sampling date. *Lichenologist* 28: 331-339
- A.K.Swanson, D.Fahselt. 1997. Effects of ultraviolet on polyphenolics of *Umbilicaria americana*. *Canadian Journal of Botany* 75(3): 284-289