**WHAT IS AQUACULTURE?**

Aquaculture is the farming of aquatic organisms, including fish, molluscs, crustaceans and aquatic plants. This agribusiness sector produces food and food additives, pharmaceuticals, cosmetics and neutraceuticals for the world’s consumers. Farming implies individual or corporate ownership of the stock being cultivated and distinguishes aquaculture from the wild harvest fishery.

**INDUSTRY NEED**

In less than a decade, the Canadian aquaculture private sector has built an industry now worth over $585 million to the national economy, and has produced 14,000 new jobs (direct and indirect) for Canadian workers. Presently, the industry is concentrated on both coasts of Canada, primarily British Columbia and New Brunswick as well as right here in Ontario. There is an urgent need for co-operation between industry, government, and universities to assist in the orderly development of this dynamic new industry.

**THE PROGRAM**

The primary purpose of this unique and exciting program is to provide an advanced, interdisciplinary, field of study leading to a M.Sc. degree in Aquaculture. The M.Sc. (Aquaculture) degree is characterized by:

- A non-thesis, course-work-based curriculum (6.5 course credits, 12 courses) in an array of disciplines encompassing aquaculture-related topics including:
  - Nutrition
  - Fisheries & Aquatic Sciences
  - Disease Management & Fish Husbandry
  - Business & Economics (in concert with the MBA program)
  - Extension Studies
- Integration of hands-on practical experiences at state-of-the-art research facilities
- A special research project, meeting the student’s particular research interests, in any of the vast number of issues related to aquaculture.

**THE GOAL**

The ultimate goal of the M.Sc. (Aquaculture) program is to produce students who have an integrated knowledge of the concepts of animal production, and an understanding of the key issues surrounding aquaculture, including advanced scientific technology. It is the objective of this program to provide graduates with the knowledge and skills to enter the industry as team leaders.
INTERDEPARTMENTAL PARTICIPATION

COURSES

Students enjoy the flexibility of choosing courses offered by a large number of academic departments on the University of Guelph campus. In addition, the following specialized courses are designed specifically for the M.Sc. (Aquaculture) program:

**AQUA 6000**

**Special Project in Aquaculture**

✔ An intensive learning opportunity focusing on an applied problem in the aquaculture industry
✔ Completion of a literature review and project in concert with hand-on experience with live animals, in either a research project or commercial setting
✔ Completion of a final report and oral presentation.

**AQUA 6100**

**Science & Technology in Aquaculture**

✔ A formal lecture, student seminar and essay course designed to examine the role of science and technology in the aquaculture industry.

**AQUA 6200**

**Practicum in Aquaculture: Culture of Salmonids**

✔ Using a problem-solving approach, students will complete a series of modules at the Alma Aquaculture Research Station covering topics in water management, hatchery operations, propagation techniques, feeding and nutrition, health and disease, economics and regulatory issues.

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**GORDON DURANT** M.Sc. (Aquaculture)
**Current Status:** Fish culture coordinator for the Ontario Ministry of Natural Resources, Peterborough, Ontario.
**Special Project:** Waste control methodologies for the Chatsworth fish culture station.

**PAULINE CHAN** M.Sc. (Aquaculture)
**Current Status:** Regulatory Affairs, Novartis Animal Health, Inc.
**Special Project:** Investigation of consumer awareness of Arctic char & an evaluation of the potential for marketing non-pigmented farm-raised Arctic char in Ontario.

**RICHARD BUSSANICH** M.Sc. (Aquaculture)
**Current Status:** Environmental consultant with LGL Limited.
**Special Project:** The potential for a total quality management philosophy & strategy involving the development of a quality assurance & control inspection system for the Ontario trout farming industry.

**JOEL KEENE** M.Sc. (Aquaculture)
**Current Status:** Environmental consulting, Guelph.
**Special Project:** The efficiency of clove oil as an anesthetic for rainbow trout, *Oncorhynchus mykiss*.

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**Recycling oxygen injection levels in recirculation module.**

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**MEASURING ALKALINITY OF WATER SAMPLES.**

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**JOSHUA NEWLANDS** M.Sc. (Aquaculture)
**Current Status:** Potentiometric test team leader for I-STAT Canada Ltd.
**Special Project:** The effect of feeding on aggressive behaviour & growth in juvenile rainbow trout.

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**GREGOR REID** M.Sc. (Aquaculture), Ph.D
**Current Status:** Post-doctoral Fellow, Dept. of Animal and Poultry Science, University of Guelph.
**Special Project:** A multi-media extension tool for the “Getting Started in Aquaculture” seminar produced by the Aquaculture Extension Centre Seminar: a proposal.

**JOEL KEENE** M.Sc. (Aquaculture)
**Current Status:** Environmental consulting, Guelph.
**Special Project:** The efficiency of clove oil as an anesthetic for rainbow trout, *Oncorhynchus mykiss*.

**PAMELA WHITE** M.Sc. (Aquaculture)
**Current Status:** Employed with New Brunswick provincial government.
**Special Project:** Studies on the detection of *Yersinia ruckeri* in rainbow trout (*Oncorhynchus mykiss*) infections.

**GEORGE RIGOS** M.Sc. (Aquaculture), Ph.D
**Current Status:** Fish Nutrition & Pathology Lab, Attiki, Greece.
**Special Project:** The effect of antibiotic treatment on the persistence of asymptomatic infections in fish with *Yersinia ruckeri*.

**GREGORY PAGE** M.Sc. (Aquaculture), Ph.D
**Current Status:** Fish nutritionist with Maple Leaf Foods, Ag Research, Guelph, Ontario.
**Special Project:** The effects of long-term feeding of high levels of dietary carbohydrates on non-specific immune parameters in rainbow trout (*Oncorhynchus mykiss*).
Since the inception of the M.Sc. (Aquaculture) program, 25 students have successfully graduated! Of these, 4 have gone on to complete their Ph.D and the others have proceeded to a wide variety of careers.

OUR STUDENTS IN ACTION

HANDBS ON DECK AT ALMA!

Located only 35 km NW of the University of Guelph, the Alma Aquaculture Research Station (AARS) is a state-of-the-art aquaculture facility built by the province for joint research and development between industry, academia and government. For the M.Sc. (Aquaculture) program, AARS serves as an excellent venue for education and training.

MAKING THEIR MARK

Students in the M.Sc. (Aquaculture) program are strongly encouraged to submit research findings of their major projects and participate actively in the aquaculture industry. Here are just a few examples:

PAPERS PUBLISHED - Special Projects Work

POPULAR PRESS ARTICLES


PRESENTATIONS

Students have presented their Special Project in Aquaculture at a variety of conferences and workshops.

AQUACULTURE ACCOLADES

RECENT REVIEW OF THE UNIVERSITY OF GUELPH M.Sc. (AQUACULTURE) PROGRAM

External appraisers for the Ontario Council on Graduate Studies (OCGS) conducted a review of the M.Sc. (Aquaculture) program. After a two-day, on-campus evaluation of the program, which included meetings with involved faculty, former and current graduate students and travel to the Alma Aquaculture Research Station, the examiners agreed that the M.Sc. (Aquaculture) program is “an excellent graduate program meeting an identified and critical need for Ontario, Canada and the world community.” When commenting on the program’s curriculum and its ability to prepare students for the workplace, the examiners felt strongly that “the combination of course work, research project and practicum at Alma makes for an excellent experience that gives the students an ability to work in aquaculture and other fields. The focus on problem solving in inter-disciplinary studies gives the students abilities that go well beyond aquaculture.”

CORE FACULTY RECOGNIZED FOR OUTSTANDING EFFORTS IN TEACHING, RESEARCH AND EXTENSION

Several core faculty of the M.Sc. (Aquaculture) program have received distinguished awards for excellence in research, teaching and extension education.

M.Sc. Aquaculture Grads

KATHELINE HUA M.Sc. (Aquaculture), Ph.D
Current Status: Post-doctoral Fellow, Dept. of Animal and Poultry Science, University of Guelph.
Special Project: Contribution of prevalence levels of Yersinia ruckeri to fish pathogen transmission.

DEENA BERLINGERI M.Sc. (Aquaculture)
Current Status: Secondary school teacher, Guelph, Ontario.
Special Project: Biochemical oxygen demand of fecal waste produced by rainbow trout fed four different diets: modeling environmental loading of waste outputs and BOD in freshwater ecosystems.

MICHAEL LAU M.Sc. (Aquaculture)
Current Status: Secondary school teacher, United Kingdom.
Special Project: The efficacy of argon gas as a pre-slaughter sedative for rainbow trout (Oncorhynchus mykiss) (Walbaum).

SOHAIL SIDDIQUI M.Sc. (Aquaculture)
Current Status: Employed by Ontario Ministry of Natural Resources, Peterborough, Ontario.
Special Project: Development of a bioenergetics-based feed requirement model for tilapia (Oreochromis niloticus).

NICOLA CROSS M.Sc. (Aquaculture)
Special Project: Market strategy and feasibility of grain-fed rainbow trout production in Ontario.

HERNAN RUIZ CASTRO M.Sc. (Aquaculture)
Current Status: Employed at University of Manitoba, Manitoba.
Special Project: Production of rainbow trout (Oncorhynchus mykiss) with all-plant diets.

INTERESTED IN PARTICIPATING IN THE M.Sc. (AQUACULTURE) PROGRAM?

Please see our website at:
http://www.aps.uoguelph.ca/~aquacentre/

Or Contact:
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