

**Department of Animal Sciences
Robert H. Smith Faculty of Agriculture
Rehovot Campus**

&

**Animal Related Programs
The Alexander Silberman Institute
of Life Sciences, Edmund J. Safra Campus**

THE HEBREW UNIVERSITY OF JERUSALEM

Report of the Review Committee

April 2009

Presented to Prof. Sarah Stroumsa, Rector

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EXECUTIVE SUMMARY

REVIEW COMMITTEE

***The Department of Animal Sciences in the Robert H. Smith Faculty of Agriculture,
Rehovot Campus***

***Animal Related Programs, The Alexander Silberman Institute of Life Sciences,
Edmund J. Safra Campus***

Executive Summary - Thursday, March 26, 2009

The Hebrew University of Jerusalem (HUJ) established a Review Committee on animal sciences consisting of five scientists from outside Israel, who convened from March 22-25, 2009. They were provided excellent, albeit short opportunities to meet scientists and to tour facilities at two sites: The Department of Animal Sciences in the Robert H. Smith Faculty of Agriculture and animal related components of the Edmund J. Safra Campus' Alexander Silberman Institute of Life Sciences. At the start of the visit, HUJ President Menachem Magidor, Rector Sarah Strousma, Vice-Rector Miri Gur-Arye and Professor Eli Friedman transmitted the purpose of the review directly to the Review Committee. They asked for an evaluation of the animal related programs and opportunities for enhancement in the scientific arenas.

The HUJ administration was very cognizant of the importance and broad significance of animal sciences and animal related programs. The first portion of the review focused on the Department of Animal Sciences in the HUJ Faculty of Agriculture – the only agricultural faculty in the entire State of Israel. There is discussion of administrative changes and the potential of shifts in the location for the closely aligned programs of the Volcani Institute. The second portion of the review was held on the Edmund J. Safra Campus of the University, with an emphasis on the animal related programs. The report of the review committee will focus on a series of specific recommendations divided between those for the Department of Animal Sciences, those common for all animal related programs, and those for the Edmund J. Safra Campus animal related programs.

RECOMMENDATIONS:

I. DEPARTMENT OF ANIMAL SCIENCES IN THE FACULTY OF AGRICULTURE

A. Organizational and Physical Structures

Overall – the Need for Strategic Planning and Consensus

1. The need for developing a strategic plan that identifies areas in which the Department of Animal Sciences wants to excel in the future and areas where it will engage in collaboration with other partners.
2. It is important that the members of the Department are involved throughout the process of developing the strategic plan to ensure consensus and commitment. It

will help them in identifying opportunities for joint research activities and in strengthening the “corporate identity” of the Department of Animal Sciences.

Relationship between the Department of Animal Sciences and the Koret School of Veterinary Medicine at HUJ Faculty of Agriculture

1. The need for integration between the Department of Animal Sciences and the Koret School of Veterinary Medicine is endorsed.
2. The Faculty of Agriculture is encouraged to aggressively move forward with its plans to integrate animal sciences and veterinary medicine, while respecting the unique missions of both units.
3. The name of the new structure was considered as inadequate and inconsistent with the other new institutes on campus. The term “Complex” appears to be a political compromise rather than a visionary programmatic statement. To be on par with the other pillars, and to have a cohesive vision of the programs within the faculty, the name should be changed (e.g. to the Institute for Animal and Veterinary Sciences). The name should reflect the programmatic interface while respecting the unique missions and separate identities of both units.
4. To facilitate collaboration and integration, consideration should be given to locating one or more Animal Scientists in the new Veterinary Science building adjacent to collaborating faculty members and one or more Veterinary Scientists in the new/renovated Animal Sciences building adjacent to collaborating faculty members.

Relationship between the Department of Animal Sciences and Institute of Animal Science in the Volcani Institute

1. The review committee strongly recommends a much closer collaboration with the Volcani animal scientists and those in the Department.
2. The Volcani Institute animal scientists housed on the Rehovot campus should remain there in new facilities. The decision to move them to Beit Dagan should be placed immediately on hold. Many of the Volcani animal scientists have international reputations who already add much to HUJ. Much more is possible, if there is the will.
3. Funds from HUJ for a new building for the Volcani scientists at Beit Dagan should be re-directed to a new facility on the Rehovot campus, preferably to a building linking the Animal Sciences and Veterinary Medicine buildings. Any residual funds should be dedicated to a core equipment facility.
4. Serious consideration should be given to merging some or all the activities of the HUJ Faculty of Agriculture with the Volcani Institute.

Infrastructure

The Department of Animal Sciences should develop a set of investment priorities including facilities, equipment and personnel as part of their strategic plan. This should also consider opportunities for sharing infrastructure with other departments and the Volcani Institute.

Interdisciplinary Research and Teaching

1. The committee recommends that the Department of Animal Sciences establish a task force to examine the teaching and research programs as they relate to interdisciplinary studies, especially but not limited to veterinary medicine. The task force should consist of faculty from Animal Sciences, Veterinary Medicine and other departments (and Faculties) as well as representatives of professional and industry organizations. The charge of the task force should be to develop a plan that identifies grand challenges in animal agriculture and defines the interdisciplinary approaches that are needed to solve these problems. Staff, budget and facility needs should be identified in the report of the task force. This can serve as a basis for curriculum development.
2. The proposal to establish four new virtual Centers to promote interdisciplinary research within the Faculty of Agriculture should be reconsidered. Proposals to establish each of the new Centers should be given rigorous external peer review and funds allocated only to those projects that deal with major problems in a truly interdisciplinary way (including other Faculties, such as Computer Sciences). Funding to each Center must be dramatically increased from \$250,000 to have the desired outcomes and impacts. It is not worthwhile to fund multi-investigator projects at the very low level proposed (\$50,000 per year).

Curricular Issues

Revision of the Animal Sciences Curricula

1. The animal sciences BSc and MSc curricula should be thoroughly revised with input from students and other stakeholders including the agricultural industry and Veterinary Medicine to ensure that the curriculum provides a state-of-the art training for students with an interest in Animal Sciences.
2. The number of course credits should be reduced to 140.
3. Curriculum has not been reviewed/modified for an extended period of time. A committee of faculty, students and industry representatives should be involved in its revision.
4. Consolidation of courses and the elimination of courses that are not meeting the needs of the animal production industry.

5. A strong program of undergraduate student guidance and mentoring is essential; An office and program to arrange for internships would be very useful and coalesced with undergraduate student guidance.
6. Evaluation of teaching by a peer review committee (including faculty members from other departments) and strategies implemented to improve quality of teaching.
7. Initiate undergraduate research experiences beyond that for only honor students.
8. Establish undergraduate/graduate colloquia.
9. Optimize bio-hazard safety in the Department of Animal Sciences.

External Advisory Board

Establish an industry (stakeholder) advisory board. A formal mechanism should be established to ensure that the needs of the Israeli industry and other stakeholders are linked to the Department of Animal Sciences at HUU.

Leadership

The review committee sees strong leadership of both departments as the most important factor which will determine the success of the Institute of Animal and Veterinary Sciences. The leadership should point the direction by formulating a joint plan and create additional opportunities by attracting additional funding and ensuring that the entire field of animal and veterinary sciences is covered.

Communication within the Faculty of Agriculture

The establishment of effective avenues of timely communication is vital among administration, dean, chairs, students and support staff.

II. BOTH FACULTIES

1. There needs to be increased collaboration between faculty members for research at both faculties and greater use of e-classes particularly for graduate students at the two faculties and at Eilat to increase the number of specialized courses particularly for PhD students and to enhance HUU's competitive advantage.
2. The faculty should offer an introduction event for new staff members and professional development activities for all staff members. A mentoring scheme is needed to ensure that identified needs for professional development are realized.

3. Activities need to be organized to improve the professional development of graduate students and these activities should be recognized as part of the requirements for a graduate degree.

III. EDMUND J. SAFRA CAMPUS ANIMAL RELATED PROGRAMS

Organization

1. The ILS or Faculty of Sciences should implement a strategic planning process to deal with organizational issues. The process should explore ways to reduce the number of programs and reorganize the ILS administrative structure so that the core missions of the unit can be more effectively carried out.
2. The strategic plan should also explore ways to promote interdisciplinary research between ILS and other departments, particularly those in the physical and computational sciences, and the sister Department at the Faculty of Agriculture in Rehovot. Space should be allocated or created that will house competitively chosen programs that encompass faculty from multiple academic units and different Faculties. Given the great individual excellence of ILS faculty, such programs can enhance funding opportunities and tackle larger scale problems at the organism and community levels. New opportunities for interdisciplinary training of graduate students will also be created.
3. The ILS should explore ways to leverage the Animal Collections resource and update its capabilities for molecular approaches. Greater integration with core ILS programs can be achieved through strategic hiring that takes advantage of this unique resource.

Undergraduate curriculum

There is a need for an undergraduate class to provide students with an appreciation of the diversity within the Animal Kingdom. An existing faculty member could be assigned to teach this class.

Graduate curriculum

Consideration should be given to the development of graduate courses that deal with critical thinking, scientific writing, professional career opportunities in industry, entrepreneurship opportunities, and scientific ethics.

The committee thanks the HUI staff who has provided excellent support to our review efforts, and in particular to Frances Neumark from the office of the HUI Rector.

COMMITTEE'S REPORT

International Review Committee on

The Department of Animal Sciences in the Robert H. Smith Faculty of Agriculture, Rehovot Campus

Animal Related Programs, The Alexander Silberman Institute of Life Sciences, Edmund J. Safra Campus

The international committee was impressed by the overall quality of the animal related programs at HUJ. There are outstanding undergraduate and graduate students, excellent educational programs and many faculty members with international reputations for their research. HUJ has the potential to remain a leader internationally for animal related programs. There is much that needs to be done to achieve the potential.

There is strong evidence for the ability of HUJ faculty to respond to new opportunities. The reputation and publication records of faculty members at HUJ bear testimony to their ability to enter and exploit new areas. Multiple publications in high citation-index journals demonstrate that the researchers are able to create or embrace emerging technologies and use them effectively to undertake cutting-edge research programs.

The report of the review committee will focus on evaluation and on a series of specific recommendations divided between those for the Department of Animal Sciences, those common for all animal related programs and those for the ILS animal related programs.

I. Department of Animal Sciences, Faculty of Agriculture

A. ORGANIZATIONAL AND PHYSICAL STRUCTURES

1. Need for Strategic Planning and Faculty Consensus

The Department of Animal Sciences engages in research at levels of the molecule, cell and organ, while maintaining a clear perspective on the animal as a whole. Departmental activities include a number of thematic areas with excellent scientists working on these fields. However, a clear strategic plan in which the Department presents its mission is lacking. The review committee recommends that the Department develops a strategic plan in which it identifies the challenges and opportunities for Israeli Animal Production and how research at the Department of Animal Sciences - in collaboration with other scientific partners within or outside HUJ - could help to meet these challenges. The strategic plan should identify the areas in which Department of Animal Sciences wants to excel in the future and areas where it will engage in collaboration with other partners. It is clear that in the strategic plan some difficult decisions need to be made to ensure the long-term sustainability of the Department of Animal Sciences. The strategic plan should be discussed with industry and funding organizations. Even more important than the final plan is the process of formulating the strategic plan. It is important that the members of the Department are involved throughout the process to ensure consensus and commitment. It will help them in identifying opportunities for joint research activities and in strengthening the “corporate identity” of the Department of Animal Sciences.

Recommendations:

- The need for developing a strategic plan should identify the areas in which Department of Animal Sciences wants to excel in the future and areas where it will engage in collaboration with other partners.
- It is important that the members of the Department are involved throughout the process of developing the strategic plan to ensure consensus and commitment. It will help them in identifying opportunities for joint research activities and in strengthening the “corporate identity” of Department of Animal Sciences.

2. Relationship between the Department of Animal Sciences and the Koret School of Veterinary Medicine at HJ Faculty of Agriculture

The Faculty of Agriculture has launched a new initiative to promote interdisciplinary research and education. The Dean presented the “Four Academic Pillars” plan that will align the different departments in new ways to achieve synergies that will enhance opportunities for collaborative research. There are four new “units” that form the academic pillars: The Robert H. Smith Institute of Plant Sciences and Genetics in Agriculture, The Institute of Biochemistry, Food Sciences and Nutrition, the Complex of Animal Sciences and Veterinary Medicine, and The Institute of Environmental Sciences and Natural Resources. To enhance collaborations between the four academic pillars, four virtual “centers” will be created. The centers will each receive \$250,000 per year to support collaborative research between faculty members allied with the center.

The Department of Animal Sciences will be a major component of one of the academic pillars. There was much concern among the Department’s professors, staff and Ph.D. level graduate students that the new organization would endanger the survival of the Department. Many staff and students were under the impression that the Department would be “merged” with the School of Veterinary Medicine. On the other hand there were some faculty members that understood the benefits and opportunities of the new structure. It was apparent from discussions with the faculty that communication between the Faculty of Agriculture administration and departmental faculty and staff has not been optimum with regard to the nature and benefits of the new organization. The “top down” approach has not yet settled within the Department.

The committee is of the firm belief that the new structure that integrates animal sciences with veterinary medicine is important and may provide greater opportunities for interdisciplinary research and integration of the teaching and research programs. While recognizing the distinct cultures of both units, there is no question that where there are overlaps in mission (both teaching and research), interactions should be encouraged and supported. These may yield new opportunities for mission-oriented research to solve problems in animal health and production that face Israeli agriculture and lead to new intellectual property. The symbolic “bridge” between the two new buildings should be expanded with substance: joint seminars, courses, research projects.

Recommendations:

- The need for integration between the Department of Animal Sciences and the Koret School of Veterinary Medicine is endorsed.
- The Faculty of Agriculture is encouraged to aggressively move forward with its plans to integrate animal sciences and veterinary medicine, while respecting the unique missions and separate identities of both units.
- The name of the new “pillar” structure was considered as inadequate and inconsistent with the other new institutes on campus. The term “Complex” appears to be a political compromise rather than a visionary programmatic statement. To be on par with the other pillars, and to have a cohesive vision of the programs within the faculty, the name should be changed (e.g. Institute for Animal and Veterinary Sciences). The name should reflect the programmatic interface and not that of a merged department.
- To facilitate collaboration and integration, consideration should be given to locating one or more Animal Scientists in the new Veterinary Science building adjacent to collaborating faculty members and one or more Veterinary Scientists in the new/renovated Animal Sciences building adjacent to collaborating faculty members.
- The proposal to establish four new virtual centers to promote interdisciplinary research within the Faculty of Agriculture should be reconsidered. Proposals to establish each of the new centers should be given rigorous external peer review and funds allocated only to those projects that deal with major problems in a truly interdisciplinary way (including other Faculties, such as Computer Sciences). Funding to each center must be dramatically increased from \$250,000 to have the desired outcomes and impacts. It is not worthwhile to fund multi-investigator projects at the very low level proposed (\$50,000 per year).

3. Volcani Institute

There are more than 20 out of a total of 30 scientists of the Institute of Animal Sciences of the Volcani Institute currently located on the Faculty of Agriculture Rehovot campus. The co-location of the ARO Volcani Institute animal scientists on the HUR campus clearly provides significant benefits to the University and *vice versa*. Many of these scientists contribute on a volunteer basis to undergraduate and graduate programs of Department of Animal Sciences.

The Volcani Institute compliments the Department of Animal Sciences in the area of animal genetics and genomics and offers access to good animal facilities at Beit Dagan. In return, through their collaboration with the Department of Animal Sciences, the scientists of the Volcani Institute get access to undergraduate and graduate students. Historically, this arrangement has worked quite well because the Volcani Institute scientists get access to Animal Sciences graduate students and have the prestige of

being part of an important research university. The review committee sees excellent opportunities to further integrate the research and other programs of Department of Animal Sciences of the HUI Faculty of Agriculture with that at the Volcani Institute. Volcani Institute facilities at Beit Dagan are used/could be used extensively by faculty members in the Department of Animal Sciences.

Under current plans, the Volcani Institute animal scientists will be moved to Beit Dagan because of space restrictions. This is likely to cause disruption to the research programs of both Volcani Institute and to the university teaching and research programs and prevent the development to the real potential.

The committee strongly recommends that funds for relocation of Volcani Institute scientists, presently located at Rehovot, to Beit Dagan be spent on a new building on the Faculty of Agriculture campus at Rehovot campus, or addition to the new buildings and renovations. This would greatly facilitate the integration with missing disciplines in the Department (e.g., genomics) and result in a greater critical mass for modern animal and veterinary sciences.

Consideration should be given to merging activities of the HUI Faculty of Agriculture with the Volcani Institute. These make sense given the fiscal constraints (crisis), resulting synergies, analogous moves made internationally and the potential to achieve a World Class institute/faculty in Israel. The review committee recognizes that this cannot result in a full merger given the distinctive roles of Universities and research organizations. However, analogous moves are made internationally (e.g. Roslin Institute becoming part of Edinburgh University, the formation of Wageningen University and Research Centre in The Netherlands and the close collaboration between ARS and university staff at many places in the USA). The collaboration offers the potential to achieve a World Class institute/faculty in Israel which has access to up-to-date facilities. The review committee was surprised to learn that a move of the Volcani animal scientists from the Rehovot Campus to Beit Dagan is being considered. This will create an obstacle for students to work with Volcani scientists and puts the contribution of Volcani scientists to the curriculum and training of students at further risk.

Recommendations:

- The review committee strongly recommends a much closer collaboration with the Volcani animal scientists and those in the Department.
- The Volcani animal scientists housed on the Rehovot campus should remain there but in new facilities.
- The decision to move them to Beit Dagan should be placed immediately on hold. Many of the Volcani animal scientists have international reputations who already add much to HUI. Much more is possible, if there is the will.
- Funds from HUI for a new building for the Volcani scientists at Beit Dagan should be re-directed to a new facility, preferably a building linking Animal

Sciences and Veterinary Medicine buildings on the Rehovot campus. Any residual funds should be dedicated to a core equipment facility.

- Serious consideration should be given to merging some or all the activities of the HJ Faculty of Agriculture with the Volcani Institute.

4. Infrastructure

Among multiple issues raised during the review, one that appeared frequently is infrastructure maintenance and upgrade. While the Department has been able to maintain good infrastructure in a few areas, the situation at the Department is becoming severely limiting. The realization of the new building will provide a much better environment in terms of office and lab space. Given the lack of funds to finance state-of-the-art research infrastructure (for example genomics and experimental facilities), it is our concern that Department will fall behind internationally.

Recommendation:

- The committee recommends that the Department develops an investment policy as part of their research strategy. This policy should also consider opportunities for sharing infrastructure with other departments and the Volcani Institute.

B. CURRICULA ISSUES

1. Revision and Reduction of the Animal Sciences Department Curricula

a. Undergraduate Program

The population of undergraduate applicants represents an array of mature and gifted students. The Faculty of Agriculture offers a foundation of obligatory courses that provide the basis for an ever demanding and changing foundation for biological sciences. These courses are completed in the first two semesters and are comprised of 53 credit hours. A more biological focus is obtained during the second two semesters (52.5 credit hours) with the courses taught across the departments and institutes of the Faculty of Agriculture. Elective courses (i.e., 35 credit hours) are completed during the last 2 semesters and are predominately taught by the Department of Animal Sciences that provides courses in the areas of ruminants, poultry, aquaculture, nutrition, genetics and biotechnology. With the present number of faculty (i.e., 14 faculty) and reductions in support staff, there is an excessive teaching assignment placed on each faculty member which overextends the work load and antagonizes research productivity.

There has not been an overall Animal Sciences faculty assessment and revision of the curriculum in many years. Number of course credits required should be reduced to 140 credit hours, and the process of curriculum revision should be done in collaboration with an industry advisory committee that can provide insight to the needs of the animal production sector and related industries to meet the needs of future animal production. This also should be done with careful communication with the Koret School of

Veterinary Medicine to have a clear understanding of what background courses best meet the needs of students. The consolidation of courses is essential and strongly recommended. The Department of Animal Sciences cannot accommodate all of the perceived needs of animal production systems. Indeed, some of these areas will be acquired via experience in the industry post-graduation in which the students are providing biological skills and computer based management that are not available to the animal industry. New faculty members are interested in providing the latest knowledge in their disciplines with new courses but this cannot be accomplished without re-assessment of existing courses. Efficiency of the faculty will be improved markedly by a careful re-assessment of the curriculum and a reduction of the course credit requirements. Appointment of such a committee should include faculty, students (undergraduate, MSc and PhD), as well as stakeholders from industry (i.e., clientele). It is essential that courses be tailored to meet needs of the current science and industry needs and include course accessibility to a general course in Introduction to Animal Sciences, Companion Animals, and career opportunities in Animal Sciences. Furthermore, students need to be instructed as to alternative career opportunities besides admission to the Koret School of Veterinary Medicine.

Undergraduate internships in which students glean real life experience on the latest application of technology in industry and farm production systems need to be implemented. Indeed this permits the type of training for students and faculty to realize what skills are needed as well as acquiring skills that cannot be provided by the existing facilities and programs within Department of Animal Sciences. A strong program of undergraduate student guidance and mentoring is essential and could be combined with an office and program to arrange for internships. A staff member specializing in guidance/advising to undergraduate students would be meritorious and would provide a uniformity of guidance to students that is not currently being achieved by individual periodic guidance of students by the cross-section of individual faculty members. Initiation of an undergraduate research experience to students beyond those considered to be honor students is encouraged.

A clear evaluation of teaching performance comprised of a peer review committee should be implemented that is linked effectively with the current student course evaluations. Strategies need to be implemented to improve quality of teaching when needed and also to train graduate students in teaching, use of software for teaching, distance learning, electronic courses, etc.

b. Graduate Program

Highly talented and dedicated students are in high caliber programs across the Department of Animal Sciences. Presently, the graduate program is coping with limited funding to the Department of Animal Sciences and re-design and extension of the Animal Sciences Building. This compromises salary support to the students, limits availability of equipment and supplies to the laboratory, and is affecting morale of the graduate students and uncertainty of their future. Part of the uncertainty of the students is a lack of uniform communications by the Department of Animal Sciences with the students regarding status of their programs.

It is recommended that the graduate students be allowed to develop an Animal Sciences Graduate Student Association to promote camaraderie among students but even more important communication with faculty and staff via student sponsored guest speakers funded by student activities and social events (i.e., such an effort was suggested by the Department of Animal Sciences students). A combination of undergraduate/graduate research colloquium is recommended to extend formal research experiences among all of the students.

There is a student-wide concern regarding bio-safety in the laboratories associated with radioisotopes, solvents and toxic reagents. Part of this is attributable to the re-modeling of the building but extends beyond. These matters should be addressed and corrected with the Laboratory Safety Committee of the Department of Animal Sciences.

In a revision of the curriculum, a course should be developed that includes processes of critical thinking and teaching, scientific writing, ethics in science and ethical use of animals. Components of this can be team taught by experts within the Hebrew University of Jerusalem within and outside of the Faculty of Agriculture. In the revision of the curriculum, E-lectures and Distance Learning should be considered in meeting the needs for structured courses in bioinformatics, genomics, career opportunities and entrepreneurship. Networking among the institutes and faculties of the Hebrew University including the Weizmann Institute and international institutions should be considered.

Recommendations:

- Number of course credits should be reduced to 140.
- Curriculum has not been reviewed/modified for an extended period of time. A committee of faculty, students and industry representatives should be involved in its revision.
- Consolidation of courses and the elimination of courses that are not meeting the needs of the animal production industry.
- A strong program of undergraduate student guidance and mentoring is essential. An office and program to arrange for internships would be very useful and coalesced with undergraduate student guidance.
- Yearly evaluation of teaching by a peer review committee and strategies implemented to improve quality of teaching.
- Initiate undergraduate research experiences beyond that for only honor students.
- Establish undergraduate/graduate colloquia.
- Optimize bio-hazard safety in the Department of Animal Sciences.

Interdisciplinary Research and Teaching

The committee recommends that the Department of Animal Sciences establish a task force. This should examine the teaching and research programs as they relate to interdisciplinary studies, especially but not limited to veterinary medicine. The task force should consist of faculty from Animal Sciences, Veterinary Medicine and other departments (and Faculties) as well as representatives of professional and industry organizations. The charge of the task force should be to develop a plan that identifies grand challenges in animal agriculture and defines the interdisciplinary approaches that are needed to solve these problems. Staff, budget and facility needs should be identified in the report of the task force. This can serve as input for curriculum development and strategic planning and as a basis for fund raising from both public and private sources.

Recommendation:

- The committee recommends that the Department of Animal Sciences establish a task force to examine the teaching and research programs. The charge of the task force should be to develop a plan that identifies grand challenges in animal agriculture and defines the interdisciplinary approaches that are needed to solve these problems. Staff, budget and facility needs should be identified in the report of the task force. This can serve as an input for curriculum development.

External Advisory Board

Establish an industry (stakeholder) advisory board. A formal mechanism should be established to ensure that the needs of the Israeli industry and other stakeholders are linked to the Department of Animal Sciences at HUU. The advisory board will have the following responsibilities:

- Communicating the needs of Israeli animal agriculture, veterinary medicine and related biotechnology industries for graduates who have experienced a meaningful curriculum.
- Communicating the short term and long term needs of Israeli animal agriculture, veterinary medicine and related biotechnology industries for research.
- Acting as an advocate for the Department of Animal Sciences with opinion leaders and policy makers in the Faculty of Agriculture, HUU and the Ministry of Agriculture.
- Enhancing the matching of HUU graduates with potential employees.

Leadership

The Dean informed us about the vision of the Faculty of Agriculture which was formed 2.5 years ago; "Feeding the Future of Agriculture while Preserving the Environment". This is a slogan not a vision. There needs to be an understanding among the Dean, faculty members and students that *status quo* does not lead to excellence. Any plan will require an interdisciplinary approach and collaboration between departments/schools

within the Faculty. During our visit we did not hear scientists from Department of Animal Sciences referring to the mission or strategic plan or a 3-year plan for implementation.

Recommendation:

- The review committee sees the need for strong leadership in the Faculty of Agriculture and the Department of Animal Sciences.

Communication

It was clear from our interviews that there is a disconnect (some would say a blatant disregard) in the flow of essential information from top to bottom. For example, the Chairs did not know information that was essential to the management of their departments (plans to move Volcani scientists off campus) and students were not aware until after the fact that their stipends/fellowships were discontinued.

Recommendation:

An awareness of this and the establishment of effective avenues of timely communication are vital among administration, deans, chairs, students and support staff.

II. BOTH FACULTIES

Institute Professional Development for Junior Faculty including Mentoring Program.

The organization of HUJ is complex and this poses challenges to recently recruited staff members. It is recommended to organize an annual introduction for new members of the faculty to inform them of the main activities and procedures of the faculty and to offer new members the opportunity to exchange experiences. The Faculties should further stimulate new staff/faculty members to develop a personal development plan in which the staff/faculty member identifies needs for professional development. Staff/faculty members without experience in teaching or supervising students should be encouraged to attend training in order to develop those competences. Professional development should not be restricted to new members of faculty. It could also help other faculty members in improving their performance or the development of skills that might help them in realizing a change in career. The faculty should offer a mentoring program to ensure that professional development targets are realized which will enhance the quality of the work of the staff member and the faculty.

Recommendation:

- The Faculties should offer an introduction event for new staff/faculty members and professional development activities for all staff/faculty members. A mentoring scheme is needed to ensure that identified needs for professional development are realized.

Improve Professional Development for Graduate Students

The review committee identifies the need to improve the professional development of graduate students. Current student advising appears to be the sole responsibility of individual faculty with whom the student does thesis research, which is supplemented by unofficial gathering of information from fellow graduate students. Professional development activities appeared to be lacking at the unit level. We recommend the creation of a professional development scheme for MSc and PhD students. The scheme should include activities to enhance their development of competences in scientific writing, writing grant applications, project management, and entrepreneurship to increase their breadth of scientific knowledge and to increase their awareness of job opportunities especially those outside research. Possibilities are to assign a mentor – who is not involved in supervision of the research project - to MSc and PhD students to assist in professional development, or have a graduate coordinator within the units to meet these needs. The mentor/ graduate coordinator could draw the attention of students to possible industrial placements or opportunities for spending a period abroad. There is a need for a means for the students to share their experiences with faculty and other students to increase their awareness of developments in adjacent scientific fields. An annual “research day” could help to increase the breadth of their knowledge and should be organized by the students to ensure that it meets their needs. To ensure that the professional development scheme meets the needs of the students it is important that the students, ideally through a graduate student association, as well as former graduates are closely involved in the development of the scheme. Activities to improve the professional development of students should be recognized as part of the requirements for a graduate degree.

Recommendation:

- Activities need to be organized to improve the professional development of graduate students and these activities should be recognized as part of the requirements for a graduate degree.

Collaboration between Different Faculties

Research in animal biology constitutes an inherent part of the Alexander Silberman Institute of Life Sciences. Animals are being used as the subject of research per se, as model systems for human diseases and as model systems for exploring various biological problems. Besides learning about animal-specific phenomena, research on animals uncovers general life processes and reveals novel principles in biology. From the material provided to us and from the discussions with the scientists in the Institute, it is evident that individual faculty members of the HUJ are outstanding scientists in their fields which are surrounded by highly motivated graduate students. At the same time, the committee recognized that faculty members do not appear very willing to form interdisciplinary research teams. It is very important to understand the reasons behind this because increasingly “break-throughs” in the life sciences require both scientific excellence as well as collaboration between disciplines. In the current system for promotion of young faculty members, emphasis is placed on the development of an

independent contribution to science. This emphasis on independence might prevent young faculty members to establish collaboration with other members of the faculty. This is considered to be counter-productive. Interdisciplinary collaborative efforts need to be implemented in a manner that each participant maintains their own scientific identity and this is readily documented.

During the interviews at both locations, the review committee heard very little about research collaboration between animal scientists at the Rehovot Campus and the Edmund J. Safra Campus. This is not surprising given the difference in the mission of both faculties and the focus of scientists on their own field of expertise. However, the review committee recognizes that graduate students would benefit from increased exchange of ideas and collaboration between scientists working on related fields at both faculties.

Recommendation:

- There needs to be increased collaboration between faculty members for research at both Faculties and greater use of e-classes particularly for graduate students at the two Faculties and at Eilat to enhance HUI's competitive advantage.

III. EDMUND J. SAFRA CAMPUS

Undergraduate curriculum

The committee did not have the opportunity to interview undergraduate students. This would have been useful. Nevertheless the structure of the undergraduate curriculum was presented in the course of discussions with faculty from the Animal Life Sciences departments. Students take a total of 144 credits in three years; 24 credits in each of 6 semesters. Courses are taken in cell and developmental biology; evolution, systematics and ecology; genetics; animal physiology; and psychobiology. The courses are heavily focused on, and founded in, genetics and molecular biology. The curriculum is comprised essentially of required courses and a limited number of electives among the departments. Several faculty and some graduate students expressed the desire to study whole animal systems and to reinstitute some form of the traditional course in zoology. The problem expressed was that there was no current faculty member capable of teaching such a course. It was also apparent that there was no opportunity for students to take liberal arts courses and some members of the review committee thought that this was unfortunate.

Recommendation:

- There is a need for an undergraduate class to provide students with an appreciation of the diversity within the Animal Kingdom. This course should/could be taught by existing faculty, perhaps even team-taught.
- A curriculum of liberal arts courses needs to be developed that will fit into the total current course requirements.

Graduate Curriculum

Graduate students were very content with their course programs, research projects and mentorship by their supervisors. Students did express a keen interest in having a course or courses that dealt with critical thinking, scientific writing, professional career opportunities in industry, entrepreneurship opportunities, and scientific ethics.

Recommendation:

- Consideration be given to the development of graduate courses that deal with critical thinking, scientific writing, professional career opportunities in industry, entrepreneurship opportunities, and scientific ethics.

Review Process

Finally, the HUI should be congratulated in the open and thoughtful manner in which the review was undertaken during the time that the review committee was in Israel. The committee thanks the HUI staff who has provided excellent support to our review efforts, and in particular to Frances Neumark in the office of the HUI Rector.

The review committee was concerned about the quality of the documentation provided. Faculty members need to do a more complete presentation of documenting their overarching programs, pointing out their individual and interdisciplinary areas of excellence, and how such programs fit in with the mission and strategic plan if one existed or will be developed. Such information would allow the review committee to strengthen specific recommendations and strategies to obtain support. In Rehovot (i.e., probably Edmund J. Safra Campus also) all faculty members appeared to have the same relative productivity (i.e., few exceptions) and appear as islands. There may well be clusters/areas of excellence and collaboration that are not readily visible in the report. Such areas had to be gleaned by specific questioning and/or knowledge of the committee members. Specific information would be helpful on the organizational structure (at departmental, institute and faculty levels), financial system and incentives. Some summary statistics on staff/faculty number, publication output together with both the enrolment and placement of PhD students would have been helpful. Faculty members and departments are advised to have different attitude towards the preparatory packages developed for a review committee. It was clear that this would be deeply appreciated by upper administration of HUI who are chartering the vision of HUI for institutional support.

APPENDICES

APPENDIX A

RESUMES OF COMMITTEE MEMBERS

1. Dr. Colin G. Scanes – Chair, University of Wisconsin
2. Prof. J.A.M. van Arendonk, Wageningen University
3. Dr. Harris A. Lewin, University of Illinois
4. Dr. William W. Thatcher, University of Florida
5. Dr. Martin P. Schreibman, Brooklyn College, City University of New York

COLIN GUY SCANES

DEGREES

- 1969 Hull University (U.K.)
B.Sc. (Hons.) First Class in Biological Chemistry & Zoology
- 1972 University of Wales (U.K.). Ph.D., 1972
- 1985 Hull University (U.K.) D.Sc.

CITIZENSHIP US

POSITIONS

- 1972–1978 Lecturer in Animal Physiology & Nutrition, University of Leeds, U.K.
- 1978–1995 Rutgers—The State University of New Jersey (1978–1982, Associate Professor; 1982–1987 Professor; 1987–1995, ProfessorII/Distinguished Professor)
- 1981–1995 Chairman, Department of Animal Sciences, Rutgers University
- 1995–2000 Executive Associate Dean/Associate Director
College of Agriculture/Agricultural Experiment Station, Iowa State University
- 1999–2001 Interim Director, Plant Science Institute
- 1995 –2004 Professor, Departments of Animal Science and Biomedical Science
Iowa State University (with continuing courtesy appointments)
- 2004 - 2007 Vice President for Research, Mississippi State University
- 2007 to date Vice Chancellor of Research and Economic Development/Dean of the Graduate School

AWARDS AND HONORS

- 1986 Rutgers University Board of Trustees Excellence Award for Research.
- 1990 Paper cited as Citation Classic in Current Contents.
- 1991 Poultry Science Association, Merck Award for Achievement.
- 1995 Cook College (Rutgers University) Award for Academic Innovation.
- 1996 Honorary Professor, National Agricultural University of Ukraine.
- 1997 Cook College (Rutgers University) Team Award - Equine Aging Research.
- 2000 Iowa Soybean Promotion Board Award for Service to the Industry
- 2001 Iowa Corn Growers Association Award for Outstanding Achievement (in establishing the Plant Sciences Institute)
- 2002 Fellow of the Poultry Science Association
- 2004 Fellow of the American Association for the Advancement of Science
- 2004 Bouffault International Animal Agriculture Award.

FEDERAL GOVERNMENT SERVICE

- 1982–1984 Member of National Science Foundation—Regulatory Biology Panel
- 1985 to date Member of USDA Competitive Grants Panels (5 panels, mgr of 2)
- 1988 National Research Council Committee on Animal Growth Biology.

- 1989–1990 Office of Technology Assessment Panel on Emerging Technologies in Animal Agriculture
- 1991 Review of USDA ARS Avian Physiology Laboratory at Beltsville.
- 1995 Member International Jury for the Belgian National Fund for Scientific Research quinquennial prizes for medical and biological sciences.
- 1995 Review of the USDA ARS (Beltsville) Germ Plasm Laboratory.
- 1999–2001 Member Board of Directors, Sustainable Agriculture and Natural Resource Management Collaborative Research Support Program (SANREM CRSP)
- 2000 to date Invited Presentations to Government agencies, legislators, NGOs, scientists, & journalists on agricultural biotechnology for US Department of Agriculture/US State Department [e.g. at US Embassy in London, Royal Society for Agriculture of England (Stoneley), Nordic countries (Estonia, Finland and Latvia), Saudi Arabia and other members of the Gulf Cooperation Council.
- 2000-2001 DOE Biobased Products and Bioenergy Roadmapping committee

OTHER BOARDS/SERVICE

- 1993 Review of all (UK) Ministry of Agriculture, Food and Fisheries Research on Animal Genetics & Reproduction.
- 1999 Member of World Bank group evaluating the Organization and Future of Agricultural Research in the Ukraine
- 2000 Member Advisory Board of Iowa Industries of the Future program
- 2000 Member Iowa Governor’s Life Sciences Advisory Committee
- 2002 to date Judge for World Food Prize John Chrystal & Ahmanson Intern awards
- 2004-2006 Member Mississippi University Research Authority (MURA) Board (President 2004/2005)
- 2004-2006 Member Mississippi Research Council Board
- 2005-2006 The Research Partnership to Secure Energy for America (RPSEA) - Board of Directors
- 2005-2006 EPSCoR Foundation - Board of Directors
- 2006-2009 Oak Ridge Associated Universities - Board of Directors

INTERNATIONAL EXPERIENCE (excluding government service)

- 1977 Visiting Fellow at Hungarian Veterinary University, Budapest
- 1984 Visiting Scientist at Volcani Institute, Rehovot, Israel
- 1986 Panama Agricultural Technology Development Project (USAID) Team Leader—Livestock Team
- 1990 NATO Fellowship at Catholic University of Leuven, Belgium
- 1981 to date International Scientists Visiting Laboratory for Prolonged Period; includes scientists from Hungary, Ireland, Singapore, France, Canada, Mexico, PRC, Roumania.
- 1991 to date Visiting Professor: Catholic University of Leuven, Belgium (1991); Autonomous University of Mexico (1994)

1996	Organizer, Conference on Agriculture and Agricultural Policy (Kiev)
2003 to date	Invited speaker on agricultural biotechnology in China, Hungary and Korea

PROFESSIONAL ACTIVITIES INCLUDE

1984–1992	International Committee for Avian Endocrinology (Chairman 1984–1988)
1987 to date	Member Editorial Board, <i>Domestic Animal Endocrinology</i> , <i>The Journal of Experimental Zoology</i> , <i>Proceedings for the Society of Experimental Biology</i> , <i>Animal Biotechnology</i> , <i>General and Comparative Endocrinology</i> , <i>Critical Reviews in Poultry Biology</i> .
2003 to date	Board International Society for Farm Animal Endocrinology
2004 to date	Editor in Chief Poultry Science

TEACHING

Iowa State University

Undergraduate - 4 courses per year: *Graduate* – 1 course per year

Rutgers University

Undergraduate – 2.5 courses per yr (freshman to senior): *Graduate* – 1.5 course per yr

Major Advisor to Grad Students 9 M.S. Graduates; 15 Ph.D. Graduates; 8 Post Docs.

Research Publications

Books 12
 Reviews/chapters 69
 Refereed papers 271
 Abstracts >220
 Other publications 14

Johan A.M. van Arendonk

i. Curriculum Vitae

Prof. dr. Johan A.M. van Arendonk (13-september-1958)
Animal Breeding and Genetics group
Wageningen University, The Netherlands



Education

- PhD in Animal Breeding and Farm Economics. Wageningen University (1985) with the 'cum laude' honour award (awarded to top 2%) Dissertation: "Studies on the replacement policies in dairy cattle".
- MSc in Animal Sciences. Wageningen University (1982) with the 'cum laude' honour award.

Academic career

2001– Full professor, Chair of Animal Breeding and Genetics, Wageningen University, head of group
1998–2001: Personal chair at the Animal Breeding and Genetics Group, Wageningen University
1993: Sabbatical fellow at the University of New England, Armidale, Australia
1989–1998: Associate Professor at the Animal Breeding and Genetics group, Wageningen University
1988: Sabbatical fellow at University of Guelph, Guelph, Canada
1985–1989: Assistant Professor at the Department of Animal Breeding, Wageningen University

Research record:

In my academic career, I have published more than 173 papers in refereed journals and two book chapters and have edited one book. According to the ISI Web of Knowledge, the papers have received 3190 citations in journals covered by *Web of Science*, which corresponds to 19 citations per paper. In the last 10 years some 20 publications belong to the top 10% highly cited publications in their field. From the number of citations (see figure below), it is clear that my scientific impact continues to increase. My h-index is now 32, i.e. I have 32 publications with at least 32 citations.

I am member of the editorial board of *Livestock Science* (2006–) and have been section editor for *Genetics* (2000–2002) and editor of the abstract books of the annual meetings of EAAP (1994–2001).

Training of young researchers:

I am coordinator of the EU-funded European Master in Animal Breeding and Genetics course (www.emabg.eu), which started in September 2007. Since 1992, 37 PhD students have graduated under my (co)supervision, and 16 PhD students are currently working on their PhD theses under my (co)supervision. Of the 37 graduates, 27 are still active in animal breeding and genetics research: 17 hold academic positions at universities or research institutes and 10 hold positions in industrial research and

management in breeding companies; these graduates are employed in The Netherlands (15 out of 27) and abroad (12 out of 27).

International activities:

- President of the Commission on Animal Genetics of the European Association for Animal Production (EAAP) (1997–2003)
- Coordinator of the EU-funded Marie Curie Training site on *Genetic and environmental factors influencing the adaptive capacity of farm animals* (2000–2004)
- Chairman of the governing council of the EU-funded European Animal Disease Genomics Network of Excellence for Animal Health and Food Safety (2006–2008)
- In the last 5 years, I have been a member of four international peer-review panels of research programmes (University of Helsinki, Roslin Institute, INRA, and International Livestock Research Institute).
- I have served as a foreign PhD examiner (Univ of Edinburgh, Univ of Helsinki, Univ of Copenhagen, Univ of New England).
- I have taught a one- or two-week course to graduate students: recently in Poznan, Poland (2007), Odense, Denmark (2004), Armidale, Australia (2002), and Ribeirão Preto, Brazil (1999).
- Member of the steering group of the European Farm Animal Breeding and Reproduction Technology Platform (www.fabretp.org) (2006–)

National academic service:

- In the period 2004–2007, I was scientific director of the graduate school “Wageningen Institute of Animal Sciences” (WIAS). The international peer-review committee that evaluated WIAS 6 months after I started as director reported that “...we were very favourably impressed by the Scientific Director’s ability to maintain a coherent and focused management approach...”
- In 2004, I was appointed professor in population genetics on the Veterinary Faculty of Utrecht University (The Netherlands).

Awards:

- In August 2001, I was awarded the *Leroy Fellowship 2001* by the EAAP (see *Livestock Production Science* 73 (2001): 85-86).
- In May 2005, I was selected as one of 200 of the country’s top scientists, referred to as the “*Cream of Science*” by the Royal Netherlands Academy of Arts and Sciences (KNAW).
- In May 2006, I was awarded the “*Justus-von-Liebig-Preis 2006*” at the University of Kiel (Germany) by the Alfred Toepfer Foundation for my contribution to the development and application of biotechnology in livestock improvement.

Harris A. Lewin, Ph.D.
Prof. of Animal Sciences
Director, Institute for Genomic Biology

EDUCATION:

B.S. Animal Science 1979, Cornell University, Ithaca, NY
M.S. Animal Breeding & Genetics 1981, Cornell University, Ithaca, NY
Ph.D. Immunology 1984, University of California, Davis, CA

PROFESSIONAL EXPERIENCE:

Director, The Institute for Genomic Biology, 2003-present
Gutgsell Endowed Chair, 1999-present
Professor of Animal Sciences, Department of Animal Sciences, University of Illinois, 1994-present
Research Professor, Microelectronics Laboratory, 2002-present
Director, The W. M. Keck Center for Comparative and Functional Genomics, 1998-2003
Center for Advanced Study Resident Associate, 2001-2002
Director, The University of Illinois Biotechnology Center, 1996-2000
Senior Scientist, National Center for Supercomputing Applications, University of Illinois, 1998-2003
Associate Professor of Animal Sciences, Department of Animal Sciences, University of Illinois, 1989-1994
Visiting Associate Professor, Section of Molecular Biology, UCLA 1991
Visiting Scientist, Dept. Animal Genetics, National Veterinary Institute, Oslo, Norway, Aug. 1989
Assistant Professor of Animal Sciences, Department of Animal Sciences, University of Illinois, 1984-1989

RECOGNITIONS AND OUTSTANDING ACHIEVEMENTS:

Distinguished Lecturer, Series in Nutrigenomics, University of Kentucky, Lexington, Kentucky, 2009; Co-organizer, Bovine Genome Consortium Meeting, Cold Spring Harbor, NY, 2009; Foreign Member, Royal Swedish Academy of Agriculture and Forestry, elected 2007, Fellow, American Association for the Advancement of Science, 2004, ACES Team Award for Excellence in Research, 2003; C. R. Henderson Lecture in Animal Breeding and Genetics, Cornell University, 2000; Session Chair (Comparative Genomics and Evolution), Genome Sequencing and Biology Meeting, Cold Spring Harbor, 2001; Burroughs Wellcome Visiting Professorship in Basic Biomedical Sciences (Washington State University), 1999-2000; Arnold O. Beckman Research Award, University of Illinois at Urbana-Champaign, 1997; Paul A. Funk Recognition Award, College of Agriculture, Consumer and Environmental Sciences, University of Illinois at Urbana-Champaign 1996; H.H. Mitchell Award for Excellence in Graduate Teaching and Research, Department of Animal Sciences, University of Illinois, 1995; University Scholar, University of Illinois at Urbana-Champaign, 1993; Young Faculty Award for Excellence in Research, College of Agriculture, University of Illinois, 1992.

MEMBERSHIPS (SELECTED):

American Association for the Advancement of Science; American Association of Immunologists; American Association of Veterinary Immunologists; International Society for Animal Genetics; American Association of Animal Science; Editorial Board: *Physiological Genomics*, 1999-present; Associate Editor: *Animal Biotechnology*, 1990-present.

OTHER ACTIVITIES (SELECTED):

Member, Domestic Animal Genome Sequencing Committee, International Society for Animal Genetics, 2002-current; Member, Advisory Board, Biosciences Division, Argonne National Laboratory, 2005-present; Scientific Advisory Board, Pyxis Genomics, Chicago, IL, 2000-present; Scientific Advisory Board, Burrill and Company, Animal Health Venture Fund, 1999-2002; Chairman, Scientific Advisory Board, GenoMar AS (Norway), 1997-2005; ISAG Standing Committee on Cattle, Sheep and Goat Gene Mapping (elected), 1996-present, Veterinary Immunology Subcommittee, American Association of Immunologists (appointed), 1993-1996; (reappointed), 1997-2000; Chairman, USDA Committee on Animal Genome Database System, 1997-1999; Governor's Biotechnology Advisory Council, 1997-1999 (appointed); Scientific Program Committee for the 26th Meeting of the International Society for Animal Genetics, 1998, New Zealand (appointed); External Advisory Committee, Food Animal Biotechnology Center, University of Minnesota, 1994-2000; Editor: National Animal Genome Research Program (NAGRP) Newsletter (1993-1996); Peer Review Panel, USDA/CSRS National Research Initiative Competitive Grants Program (Animal Molecular Genetics and Gene Mapping), 1990, 1993; NAGRP Genome Executive Committee, 1993-1994.

SELECTED PUBLICATIONS:

(selected since 2007, from a total of 152 papers and 21 book chapters)

- Yang, X., S. L. Smith, X. C. Tian, H. A. Lewin, and T. Wakayama. 2007. Nuclear reprogramming in cloned embryos and its implications for therapeutic cloning. *Nature Genetics* **39**:295-302.
- Kumar, C. G., J. H. Larson, M. R. Band and H. A. Lewin. 2007. Discovery and characterization of 91 novel transcripts expressed in cattle placenta. *BMC Genomics* **8**:113.
- Snelling, W. M., R. Chiu, J. E. Schein, M. Hobbs, C. A. Abbey, D. L. Adelson, J. Aerts, G. L. Bennett, I. E. Bosdet, M. Boussaha, R. Brauning, A. R. Caetano, M. M. Costa, A. M. Crawford, B. P. Dalrymple, A. Eggen, A. Everts-van der Wind, S. Floriot, M. Gautier, C. A. Gill, R. D. Green, R. Holt, O. Jann, S. J. M. Jones, P. J. de Jong, S. M. Kappes, J. W. Keele, D. M. Larkin, H. A. Lewin, J. C. McEwan, S. McKay, M. A. Marra, C. A. Mathewson, L. K. Matukumalli, S. S. Moore, B. Murdoch, F. Nicholas, K. Osoegawa, A. Roy, H. Salh, L. Schibler, R. Schnabel, L. Silveri, L. C. Skow, T. S. Sonstegard, J. Taylor, R. Tellam, C. P. Van Tassell, J. L. Williams, J. E. Womack, N. H. Wye, G. Yang and S. Zhao 2007. A physical map of the bovine genome. *Genome Biology* **8**:R165.
- Loor, J. J., R. E. Everts, M. Bionaz, H. M. Dann, D. E. Morin, R. Oliveira, S. L. Rodriguez-Zas, J. K. Drackley and H. A. Lewin. 2007. Nutrition-induced ketosis alters metabolic and signaling gene networks in liver of periparturient dairy cows. *Physiological Genomics* **32**:105-16.
- Rodriguez-Zas, S. L., K. Schellander and H. A. Lewin. 2008. Biological interpretations of transcriptomic profiles in mammalian oocytes and embryos. *Reproduction* **135**:129-139.

- Everts, R. E., P. Chavatte-Palmer, A. Razzak, I. Hue, C. A. Green, R. Oliveira, X. Vignon, S. L. Rodriguez-Zas, X. C. Tian, X. Yang, J.-P. Renard and H. A. Lewin. 2008. Aberrant gene expression patterns in placentomes are associated with phenotypically normal and abnormal cattle cloned by somatic cell nuclear transfer. *Physiological Genomics*. **33**:65-77.
- Replogle, K., A. P. Arnold, G. F. Ball, M. Band, S. Bensch, E. A. Brenowitz, S. Dong, J. Drnevich, M. Ferris, J. M. George, G. Gong, D. Hasselquist, A. G. Hernandez, R. Kim, H. A. Lewin, L. Liu, P. V. Lovell, C. V. Mello, S. Naurin, S. Rodriguez-Zas, J. Thimmapuram, J. Wade and D. F. Clayton. 2008. The Songbird Neurogenomics (SoNG) Initiative: Community-based tools and strategies for study of brain gene function and evolution. *BMC Genomics* **9**:131.
- Carvalho Neta, A. V., A. P. Stynen, T. A. Paixão, K. L. Miranda, F. L. Silva, C. M. Roux, R. M. Tsohis, R. E. Everts, H. A. Lewin, L. G. Adams, A. F. Carvalho, A. P. Lage and R. L. Santos. 2008. Modulation of the bovine trophoblastic innate immune response by *Brucella abortus*. *Infect. Immun.* **76**:1897-1907.
- Smith, S. L., R. E. Everts, L.-Y. Sung, F. Du, R. L. Page, B. Henderson, S. L. Rodriguez-Zas, T. L. Nedambale, J.-P. Renard, H. A. Lewin, X. Yang and X. C. Tian. 2008. Gene expression profiling of single bovine embryos uncovers significant effects of in vitro maturation, fertilization and culture. *Mol. Reprod. Dev.* **76**:38-47.
- Marjani, S. L., D. Le Bourhis, X. Vignon, Y. Heyman, R. E. Everts, S. L. Rodriguez-Zas, H. A. Lewin, J.-P. Renard, X. Z. Yang and X. C. Tian. 2009. Embryonic gene expression profiling using microarray analysis. *Reprod. Fertil. Dev.* **21**:22-30.
- Seo, S. and H. A. Lewin. 2008. Reconstruction of metabolic pathways for the cattle genome. *BMC Systems Biol.* (in press).
- Larkin, D. M., G. Pape, R. Donthu, L. Auvil, M. Welge and H. A. Lewin. 2009. Breakpoint regions and homologous synteny blocks in chromosomes have different evolutionary histories. *Genome Res.* (in press).
- Mansouri-Attia, N., O. Sandra, J. Aubert, S. Degrelle, R. E. Everts, C. Giraud-Delville, Y. Heyman, L. Galio, I. Hue, X. Yang, X. C. Tian, H. A. Lewin and J.-P. Renard. 2009. The endometrium as an early sensor of *in vitro* manipulation technologies. *Proc. Natl. Acad. Sci. (USA)* (in press).

CURRICULUM VITAE

WILLIAM W. THATCHER
Graduate Research Professor
Animal Sciences Department
University of Florida
Gainesville, Florida 32611-0920
Telephone: 352-392-5590 Office and Laboratory
Fax: 352-392-5595 E-mail: Thatcher@animal.ufl.edu

PERSONAL

Born, Baltimore, Maryland - January 12, 1942; Married August 28, 1978 to Marie-Joelle Duchantre Thatcher

DEGREES

B.S. (Agriculture), 1963, University of Maryland, College Park.

M.S. (Major - Dairy [Biochemical Genetics]; Minor - Biochemistry), University of Maryland, 1965; Thesis: The Occurrence and Interrelationships of Milk Protein, Serum Transferrin and Blood Group Polymorphisms in Cattle". (Advisor, Dr. Charles A. Kiddy, USDA).

Ph.D. (Major - Physiology of Reproduction and Lactation; Minors - Physiology and Statistics), Michigan State University, Ph.D. 1968; Dissertation: Physiological, Biochemical and Hormonal Factors Limiting Lactation". (Advisor, Dr. H. Allen Tucker, Michigan State University)

PRESENT POSITION

Emeritus Graduate Research Professor, Animal Sciences Department

PREVIOUS APPOINTMENTS AT THE UNIVERSITY OF FLORIDA

Assistant Professor (Assistant Animal Physiologist; 1969)

Associate Professor (Associate Animal Physiologist; 1974)

Professor (Physiologist; 1978)

Graduate Research Professor (1988)

University of Florida Research Foundation Professorship (1998)

Emeritus Graduate Research Professor (2004)

SABBATICAL LEAVES

1. September 1977 to June 1978 at the Physiology of Reproduction Laboratory, Institut National de la Recherche Agronomique at Nouzilly, France. Applicant studies with P. Mauleon, J.Thimonier and M.Terqui. Investigations centered on regulation of Prostaglandin secretion during the estrous cycle and the early postpartum period. Investigations complemented ongoing programs at the University of Florida.
2. February 1985 to December 1985 at the Physiology of Reproduction Laboratory, Institut National de la Recherche Agronomique at Nouzilly, France. I studied with M.A. Driancourt, A. Paroff and M. Terqui. Investigation centered on ovarian follicle development during early pregnancy and purification of bovine conceptus proteins.

SOCIETY MEMBERSHIPS

American Association for the Advancement of Science; American Dairy Science Association; American Society of Animal Science; Society for the Study of Reproduction

HONORS AND AWARDS

Recipient of NIH Predoctoral Fellowship; Outstanding Sigma Xi Doctoral Research Award; Two Master of Science students were awarded IFAS Award of Excellence for Graduate Research - MS at the University of Florida. W. W. Thatcher served as chairman of supervisory committees; Recipient of 1976-1977 "Gamma Sigma Delta Junior Faculty Award" at the University of Florida; Recipient of 1977-1978 "Sigma Xi Outstanding Faculty Research Award of the University of Florida Chapter"; Recipient of Fulbright - Hayes Research Travel Grant for Sabbatical Studies in Nouzilly, France; Recipient of "Upjohn Physiology Award" for 1981 of the American Dairy Science Association; Recipient of "The American Society of Animal Science Award in Animal Physiology and Endocrinology" for 1985; Recipient of the 1990 "Gamma Sigma Delta Senior Faculty Award" at the University of Florida. Gamma Sigma Delta is The Honor Society of Agriculture; Recipient of the University of Florida "Superior Accomplishments Award" for faculty; Mr. Matthew C. Lucy (Ph.D. student of William W. Thatcher) received the 1990 National Richard M. Hoyt Award of the American Dairy Science Association (award recognizes the excellence of graduate student and superior potential as a scientist); Recipient of the "Borden Award" of the American Dairy Science Association, 1992; Recipient of the Society for the Study of Reproduction Research Award, 1994; Recipient of the L.E. Casida Award for Excellence in Graduate Training from the American Society of Animal Science, 1997; University of Florida Research Foundation Professorship (1998); National Association of Animal Breeders (NAAB) Research Award, 2000; Recipient of the 2001-2002 Graduate Teaching/Advising Award in the College of Agriculture and Life Sciences, University of Florida; Recipient of 2001-2002 Doctoral Dissertation Advisor/Mentoring Award from the University of Florida, April 24, 2002; Merit Dairy Management Research Award of the American Dairy Science Association, 2002; Honorary Member of American College of Theriogenologists, 2003; Recipient of the Morrison Award of the American Society of Animal Science, 2006. Dairy Fellows Award 2007, American Dairy Science Association;

TEACHING

Course

DEPARTMENT OF ANIMAL SCIENCES 6531 - Endocrinology: This graduate course has been taught yearly from 1970-1988 and on a biennial basis since 1988 to 2003 when entering Emeritus Graduate Research Professor status.

MENTORSHIP/TRAINING

Trained 62 persons for either MS, PhD, Postdoctoral, or Sabbatical programs.

PUBLICATIONS

Refereed Publications (326 to date); 304 Listed in Pub Med:

<http://www.ncbi.nlm.nih.gov/sites/entrez?db=pubmed&cmd=search&term=THATCHER%20W>

Chapters in Books (45 to date)

MARTIN PAUL SCHREIBMAN, Ph.D.

Distinguished Professor Emeritus, Biology

Founder and Director Emeritus, Aquatic Research and Environmental
Assessment Center (AREAC), Brooklyn College, CUNY

(718) 951 5110 (718) 951 4768 (FAX) <mailto:martins@brooklyn.cuny.edu>

Dr. Martin P. Schreiberman: A career of teaching and research that spans more than 50 years. Founder and Director Emeritus of Brooklyn College's Aquatic Research and Environmental Assessment Center (AREAC), a 2.5 million dollar state-of-the-art teaching and research institute that studies aquatic organisms and the environments that they inhabit. Credited with over 190 scientific published citations and seven books. Topics of research have ranged from issues and concerns of space travel and extraterrestrial habitation and biomedical concerns (normal and abnormal development, cancer and aging) to the impact of urban communities on surrounding estuaries and aquatic ecosystems. In recent years interest has focused on coastal and barrier island ecosystems in the tri-state area. Current passion and research is on urban aquaculture (fish farming in the city) and its impact on global environmental and social issues, such as economic development, job training, world fisheries management, feeding the hungry of the world and ecosystem sustainability. Has helped to develop and implement meaningful environmental science curriculum for high school students and their teachers. Attained an international reputation; expertise is sought after by many established and developing countries as well as international agencies such as the World Bank and the World Health Organization to bring quality food and economic stability through modern sustainable aquaculture technology. Countless invitations to lecture and for scientific collaborations from scientists and institutes from around the world.

EDUCATION

B.S.- 1956 - Brooklyn College, CUNY;

M.S.- 1959 - New York University;

Ph.D. - 1962 - New York University

ACADEMIC AND PROFESSIONAL RECOGNITION

2004- Coastal America award for Big Egg Salt Marsh Restoration in Jamaica Bay NY; Partnership Award (Citation originates in President Bush's office)

2004- First "Make a Difference Faculty of the Year" award, Brooklyn College Student body and Division of Student Life

2000- Certificate of Merit for scientific achievement from New York State Governor George Pataki

2000- Distinguished Achievement Award in Biological and Life Sciences, Brooklyn College Alumni Assoc.

1991 - Distinguished Professor in Biology, City University of New York (now emeritus)

1994 - Present: Founder and Director Emeritus, Aquatic Research and Environmental Assessment Center (AREAC), Brooklyn College

1999 –Present: Invited member of Consortium to study NY\NJ Harbor Pollution, New York Academy of Sciences

1999 - Present: Member, Board of Directors, Brooklyn Center for the Urban Environment
1994 – 1998; 1999 - Present: Member of Executive Committee, Board of Oceans and Atmosphere (National Assoc. State Universities and Land Grant Colleges)
1994 - 1998: Member of Technical/Advisory Board; Northeastern Regional Aquaculture Center
1990 - 1995: Elected Member, International Union of Biological Sciences (National Academy of Sciences).
1966 - Present: Research Associate in Fish Endocrinology, Sciences, New York Aquarium.

Relevant Publications (from more than 190):

Zarnoch, C.B. & Schreibman, M.P. (2008) Influence of temperature and food availability on the biochemical composition and mortality of juvenile *Mercenaria mercenaria* (L.) during the over-winter period. Aquaculture, In Press.

Schreibman, M.P. & Zarnoch, C.B. (2009) Aquaculture methods and observations of juvenile horseshoe crabs (*Limulus polyphemus*). In: Botton, M., Tanacredi, J. & Smith, D. (Eds.) Biology and Conservation of Horseshoe Crabs. Springer. In Press.

Ringenary, M.J., Molof, A, Tanacredi, J., Schreibman, M.P., and Kostarelos, K. (2007) Long-term sediment bioassay of lead toxicity in two generations of the marine amphipod *Elasmopus laevis*, S.I. Smith, 1873, *Enviro. Tox. And Chem.*, 26:1700-1710

Zarnoch, C.B. and Schreibman, M.P., 2006. Understanding the over-winter mortality of hard clam seed, *Mercenaria mercenaria* (L.). *J. Shellfish Research* 25:2 pp 651.

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APPENDIX B

List of People who Met with the Committee

The President, Prof. Menachem Magidor

The Rector, Prof. Sarah Stroumsa

The Vice-Rector, Prof. Miri Gur-Arye

Head of Academic Review for the Sciences, Prof. Eliahu Friedman

Incoming Head of Academic Review, Prof. Yaacov Shul

Dean of the Faculty of Agriculture, Prof. Eli Feinerman

Dean of the Faculty of Sciences, Prof. Gad Marom

Rehovot:

Chairman, Department of Animal Sciences, Prof. Jaap van Rijn

Chairman of Undergraduate Studies, Prof. Bertha Sivan

Senior Faculty:

Prof. Ruth Meidan, Prof. Orna Halevy, Prof. Boaz Robinzon, Prof. Zehava Uni,

Prof. Aharon Friedman

Junior Faculty:

Dr. Sameer Mabeesh, Dr. Nurit Argov, Dr. Lior David, Dr. Zvi Roth

Emeriti:

Prof. Berman, Prof. Paperna, Prof. Nir

Volcani Institute:

Dr. Joel Weller, Dr. Micha Ron, Dr. Eyal Seroussi

External Teachers:

Prof. Gideon Hulata, Dr. Noam Meiri, Dr. Haim Sivan, Prof. Stepa Soback

Other:

Director of the Koret School of Veterinary Medicine, Prof. Shimon Harrus

Prof. Gad Glaser, Faculty of Medicine

Prof. Boaz Yuval, Head of Teaching Program, Faculty of Agriculture

Edmund J. Safra Campus:

Chairman of Institute of Life Sciences, Prof. Shai Arkin

Former Head of the Institute of Life Sciences, Prof. Yossi Yarom

Head of Life Science Teaching Program, Prof. Michael Brandeis

Dept. of Cell and Developmental Biology:

Head, Dr. Nissim Ben-Arie

Dept. of ESE:

Head, Prof. Ran Nathan, Prof. Guy Bloch, Dr. Ariel Chipman, Prof. Amatzia Genin,

Prof. Ronen Kadmon

Dept. of Genetics:

Prof. Ariel Darvasi, Dr. Sagiv Shifman, Dr. Sebastian Kadener
Prof. Michael Brandeis (Head of Life Sciences Teaching Program),

Dept. of Animal Physiology:

Prof. Benny Hochner, Prof. Ioav Cabantchik (Former Head of Inst. of Life Sciences), Prof. Marshall Devor (head of Psychobiology Teaching Program), Dr. Adi Mizrahi, Prof. Yossi Yarom (Former Head of Inst. of Life Sciences)

Other:

Dr. David Greenberg (Prof. Hermona Soreq's Lab)
Prof. Alan Matthews, Head of Animal Collection

Dr. Mordechai Shonfeld – in charge of Inter-Departmental Equipment (Agriculture)

Dr. Rony Kalman & Osnat – in charge Animal Housing Facilities (Edmund J. Safra Campus)

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