Biochemistry
Fiscal Year 2012

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Organization

The Department of Biochemistry and Molecular Biology is one of four basic science departments within the School of Medicine and Health Sciences. The School is one of the Colleges within the University of North Dakota. There are two biochemistry departments within the State of North Dakota, the other being at North Dakota State University. The Department is chaired by Katherine Sukalski, PhD, (Interim) who reports to the Vice President for Health Affairs and Dean of the School of Medicine, Joshua Wynne, MD, MBA, MPH.

Mission of the Unit

The faculty of the Department of Biochemistry and Molecular Biology (BMB) will excel in teaching, research, and service. Department faculty members assist graduate, medical, and undergraduate students to understand the fundamentals of biochemistry and molecular biology as appropriate for their career paths. Our graduate program provides a student-oriented educational experience in which research is emphasized. The pursuit of research or other scholarly activity is highly valued. Service to the school, university, and our profession is expected.

In support of the university’s teaching mission, we provide instruction to medical, graduate, and undergraduate students. In the integrated medical curriculum, we provide lectures, write cases, and facilitate small groups in support of the first two years of medical education. Dr. Sukalski is a member of the SMHS Medical Curriculum Committee. At the graduate level, we participate in the BIMD Courses, an interdisciplinary series of core courses taken by all first year biomedical graduate students. Dr. Shabb currently chairs the Basic Science Graduate Curriculum Committee which oversees the first year curriculum. We offer discipline-based courses that support the MS and PhD degree programs in BMB under the coordination of Dr. Min Wu, Graduate Program Director. Additional graduate teaching involves the mentoring of graduate students as they undertake and complete their research projects. At the undergraduate level, we provide three courses required by various UND majors: Nutrition and Dietetics; Medical Laboratory Science; Forensic Science; Cytotechnology; Chemistry, Biochemistry Emphasis; and Biology-Molecular, Cellular, and Developmental Biology Option.

In research, we regard ourselves as part of the worldwide network of scientists who strive to understand aspects of human biology as well as the biology of other organisms that affect human health. Biochemistry and molecular biology are disciplines that provide language and context to other biomedical disciplines, much as mathematics serves that role for physics, engineering, and the computer sciences. Faculty members and their students and research associates conduct meaningful high-quality research that is worthy of support by external granting agencies. The results of such research are published in peer-reviewed journals that are nationally and internationally recognized. Drs. Joyce Ohm, Brij Singh, and Roxanne Vaughan served on the SMHS Research Committee. As mentored participants in the research conducted, graduate students are prepared for careers in research and/or teaching. Students leaving the MS and PhD programs are the equal of their peers across the nation in competing for the next step in their career ladder.

While being fully engaged in their own research efforts and teaching activities, faculty serve their professions as study section grant reviewers and as reviewers of manuscripts. Some serve on the planning committees of professional organizations. Between them they sit on a large number of university, SMHS, and departmental committees. BMB faculty provided service on the following SMHS Standing Committees: Admissions (Sukalski, chair); Basic Science Graduate Curriculum Committee (Foster and Shabb, chair); Committee on Promotion and Tenure (Singh); Medical Curriculum Committee (Sukalski); Nominating Committee (Sukalski, chair, and Vaughan); Research Committee (Ohm, Singh, and Vaughan); Medical Student Performance Committee (Vaughan). Dr. Vaughan served on the Administrative Search Committee which oversaw the search process for four high level positions in the SMHS (Chair of the Basic Science Department, Associate Dean for Student Affairs and Admissions, Director of the MPH Program, Chair of Geriatrics). Dr. Shabb served on the Basic Science Advisory Subcommittee to
Performance of the Unit

- Accomplishments

The Department of Biochemistry and Molecular Biology had an excellent year! The faculty members were recognized for research accomplishment with the 2012 Fellows of the University Award for Departmental Excellence in Research at Founders Day in February 2012. Roxanne Vaughan was awarded the Chester Fritz Distinguished Professorship (August 2011) and Brij Singh and John Shabb were recognized by the SMHS as 2012 UND Faculty Spirit Award winners.

The department had a very good year in terms of research productivity: A total of 22 peer-reviewed papers were published in addition to many meeting abstracts. Faculty of the department were very well funded by the NIH, holding three NIH R01s (Vaughan (2) and Singh (1)) and five other NIH grants (Foster (R15), Milavetz (R03 and R15), Singh (R03) and Wu (R15)). Dr. Ohm’s R01 proposal to the NIH will be funded later in the summer of 2012. Numerous other competitive grants supported the work of the faculty. Especially of note: Dr. Wu had funding from the Flight Attendant Medical Research Institute and the Department of Defense and Dr. Shabb was supported by North Dakota INBRE Proteomics Core. Between them, Foster, Singh, Ohm, Wu, and Vaughan had two interdisciplinary UND COBRE Neuroscience Pilot Grants involving other SMHS faculty. Dr. Dhasarathy joined the faculty in January of 2012 and was awarded an EPSCoR start up package. A complete list of publications and funding is found at the end of this section.

The faculty roster changed this year. Brij Singh was promoted to full professor (effective August 15, 2012). There were two additions to the BMB faculty: Linglin Xie, PhD, began as Assistant Research Professor in July 2011 and Archana Dhasarathy, PhD began as Assistant Professor (tenure track) in January 2012. At the end of the reporting period BMB had 4 female tenure-track faculty (2 assistant, 1 associate, and 1 full professor); 4 male tenure-track faculty (2 associate and 2 full professors, one of them at 20 % time); 1 male assistant professor, non-tenure track; and 1 female research assistant professor.

Accomplishments in teaching will be discussed in more detail under assessment.

FUNDING and PUBLICATIONS

Activity between July 1, 2011 – June 30, 2012

Faculty of the Department of Biochemistry and Molecular Biology

- Full Professors: BI Milavetz, RA Vaughan
- Associate Professors: JB Shabb, BB Singh, KA Sukalski, M Wu
- Assistant Professors: JE Ohm, A Dhasarathy
- Assistant Professor (non-tenure track): JD Foster

James D. Foster - Research Awards

<table>
<thead>
<tr>
<th>Title</th>
<th>Source</th>
<th>Amount</th>
<th>PI</th>
<th>Award Period</th>
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<tbody>
<tr>
<td>Dopamine Transporter Palmitoylation</td>
<td>NIH/NIDA R15</td>
<td>$405,000</td>
<td>J.D. Foster</td>
<td>9/15/2011 – 9/14/2014</td>
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<tr>
<td>Phosphorylation and Regulation of Dopamine Transporters</td>
<td>NIH/NIDA R01</td>
<td>500,000</td>
<td>RA Vaughan</td>
<td>8/1/2009-8/31/2012</td>
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<tr>
<td>Alpha Synuclein and Dopamine Transporter Palmitoylation</td>
<td>UND COBRE Neuroscience Pilot Grant (NIH/NCRR)</td>
<td>$40,000</td>
<td>Multiple RA Vaughan, JD Foster, EJ Murphy</td>
<td>8/9/2011-5/31/2012</td>
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Title: Molecular mechanisms of neurodegenerative disorders: A role for environmentally-induced oxidative stress in the development of Parkinson’s Disease
Source: UND COBRE Neuroscience Pilot Grant (NIH/NCRR)
Amount: $ 40,000 Award Period: 8/9/2011-5/31/2012
PI: Multi-PIs: Foster, Watt, Singh, Ohm, Wu

James D. Foster - Publications

Barry Milavetz - Research Awards
Title: Epigenetic Regulation of the Initiation of an SV40 Lytic Infection
Source: NIH R15
Amount: $ 414,000 Award Period: 2/7/12 – 1/31/15
PI: BI Milavetz
Title: Histone Hyperacetylation in Replicating SV40 Chromosomes
Source: NIH RO3
Amount: $ 139,000 Award Period: 9/15/ 2008 – 1/31/2012
PI: BI Milavetz

Joyce E. Ohm - Research Awards
Title: Identifying Gene Expression Regulation at the 5-Methyl-cytosine and 8-Hydroxy-2'-deoxyguanosine Interplay in DNA Promoter Regions Harboring CpG islands: A case for oxidative stress regulation of gene expression.
Amount: $ 60,000 Award Period: 09/2011-08/2012
PI: Cardoza PI, University of Montana Co-PI:JE Ohm
Title: Molecular mechanisms of neurodegenerative disorders: A role for environmentally-induced oxidative stress in the development of Parkinson’s Disease
Source: UND COBRE Neuroscience Pilot Grant (NIH/NCRR)
Amount: $ 60,000 Award Period: 08/2010-08/2011
PI: (Multiple) Foster, Watt, Singh,Ohm,Wu

Title: Faculty Start-up Grant
Source: EPSCoR through NSF grant #EPS-0814442 and UND
Amount: $ 350,000 Award Period: 09/2009-08/2011
PI: JE Ohm

Joyce E. Ohm - Publications

John B. Shabb - Research Awards
Title: Structural analysis of recombinant Candida albicans rAla3p-N expressed in Saccharomyces cerevisiae
Source: Novadigm Therapeutics
Amount: $75,000 Award Period: 4/1/11-3/30/12
PI: JB Shabb

Title: North Dakota INBRE: Health and the Environment
Source: NIH/NCRR 1 P20-RR 16471-09
Amount: $121,000 (Proteomics Core Budget) Award Period: 8/1/09-4/30/14
PI: Donald A. Sens JB Shabb(Proteomics Core Director, 10% effort)

Brij B. Singh - Research Awards
Title: Ceramide Membrane Microdomains Regulate Cytokine Secretion
Source: NIH, NIAID R03 AI097532
Amount: $69,000 Award Period: 05/15/12 - 04/30/2014
PI: BB Singh Collaborator: M Wu

Title: TRPC1 and saliva secretion
Source: NIH, NIDCR RO1 DE017102-06A1
Amount: $1,773,102 Award Period: 07/01/06-06/30/2016
PI: BB Singh Collaborator: M Wu

Title: Neurodegenerative Diseases and Signaling
Source: NIH, NCRR (COBRE) P20 RR017699
Amount: $1,223,600 (Project: TRPC1, Calcium, and Parkinson’s Disease) Award Period: 08/01/07-07/31/2012
PI: Jonathon Geiger BB Singh Project Leader
Total Support $10,092,241

Title: STAT3 and its Acetylation in Acute Lung Injury
Source: NIH, NHLB 1R01HL092905-01
Amount: $1,653,000 Award Period: 08/01/08-05/31/2013
PI: Hongwei Gao, Harvard BB Singh Collaborator

Brij B. Singh - Publications
functions.Advances in Experimental Medicine and Biology. 740, 143-157
Cholesterol-Enriched Diet Causes Age-Related Macular Degeneration-Like Pathology in Rabbit retina. BMC Ophthalmology. 11:22-29.

Katherine A. Sukalski- Awards
Title: Process-Oriented Guided Inquiry Learning: A Student-Centered Active Learning approach to Teaching Biochemistry (BMB 301) SCALE-UP Model Project.
Source: UND Office of Instructional Development
Amount: SCALE-UP Classroom access and faculty development support.
Award Period: May 2012 – May 2013
PI: KA Sukalski Co-I John Shabb

Title: New Faculty Start-up Award
Source: ND EPSCoR
Amount: $99,100 Award Period: July 2011 – June 2013
PI: KA Sukalski

Roxanne A. Vaughan - Research Awards
Title: Phosphorylation and Regulation of Dopamine Transporters
Source: NIH, National Institute on Drug Abuse 5R01 DA 13147-10
Amount: $521,739 Award Period: 08/01/2009-7/31/2012
PI: RA Vaughan

Title: Structure and Function of Dopamine Transporters
Source: NIH, National Institute on Drug Abuse 1R01 DA026530-01
Amount: $95,524 (subaward) Award Period: 07/01/09-06/30/12
PI: CK Surratt Co-PI: RA Vaughan, D Lapinski, JR Lever

Title: Computational and Biochemical Docking of Dopamine Transporter Antagonists
Source: NIH, National Institute on Drug Abuse 1 R01 DA027845
Amount: $1,355,000 Award Period: 01/07/10-12/31/14
PI: RA Vaughan and LK Henry

Title: Protein palmitoylation ina-synuclein models of Parkinson’s disease
Source: UND COBRE Neuroscience Pilot Grant (NIH/NCRR)
Amount: $40,000 Award Period: 08/01/11-05/30/12
PI: (Multiple) RA Vaughan, JD Foster, EJ Murphy


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Linglin Xie - Publications


Equipment Grants

Brij B. Singh - Equipment Grants

Title: Acquisition of a Stereology System for Research and Education in Cell Signaling

Source: NSF Major Research Instrumentation

Total cost $224,840.00 Award Period: September 2009- August 2012

PI: Van Doze Co-PI: BB Singh

The long term goal of this project is to obtain a stereology system at UND.

Challenges

The most significant challenge during 2011/2012 was the extramural funding situation. BMB faculty members are to be commended for rising to the challenge. As noted above every faculty member in the basic science research track who has been here longer than a year has extramural funding to support their research.

During the 2011/2012 academic year the Department of Biochemistry and Molecular Biology was under interim leadership for the third consecutive year. The previous academic year, the decision was made to reorganize the four basic science departments into one and July 2012 was the target date for having a new chair on board. The chair’s search was not successful and we are in the midst of a second effort. BMB faculty have been carrying out our day-to-day responsibilities in teaching biochemistry and molecular biology to medical, graduate, and undergraduate students; providing service to the SMHS, the University, and our professions; and moving our own research programs forward against the backdrop of uncertainty regarding our futures in the SMHS.

Priorities for Next Year

General Comments

Presumably BMB along with the other basic science departments in the SMHS will cease to exist during the 2012/2013 academic year and the faculty will become part of the newly formed Biomedical Sciences Department under the leadership of a single chair. The actual merger awaits the identification and recruitment of a chair. There are several initiatives which we would consider if we had a future as a
Commitment to Cross-Disciplinary Epigenetics Group

The department is committed to supporting the cross-disciplinary Epigenetics Group that has been meeting on the UND campus since 2010. Members of the group come from the basic science departments in the SMHS in addition to Biology, GF Human Nutrition Research Center, Nursing, and Computer Science. The group planned and submitted a COBRE proposal (Roxanne Vaughan PI) that was scored very highly and has a good chance of being funded this cycle. Jonathen primary literature PT and Interim Chair ACB, is a Senior Advisor to the COBRE and was instrumental in preparing the proposal. Brij Singh was the primary writer of the proposal and is a member of the internal advisory board. Project leaders are Archana Dhasarathy (BMB), Joyce Ohm (BMB), Sergei Nechaev (ACB), Cindy Anderson (Nursing), Lucia Carvelli (PPT).

Teaching

We will proceed with revision of our undergraduate teaching program which we hope will get an opportunity in the future to inform revision of the interdisciplinary basic science courses. Undergraduate Biochemistry, BMB 301, is a traditional lecture-based course offered once a year in the spring with a typical enrollment of 120 students. Drs. Shabb and Sukalski will implement a student-centered active learning approach termed Process-oriented Guided Inquiry Learning in the spring of 2013. In March of 2012, we competed successfully through the Office of Instructional Development for space in the UND SCALE UP classroom for 2013. The application of small group active learning to biochemistry is a growing national trend. It is far more effective than traditional lecturing in supporting the development of critical thinking skills, group problem solving, and independent learning.

The revision of BMB 301 and the planned creation of new materials for BMB 401 will be a challenge in terms of faculty effort. Since January of 2010, Dr. David Lambeth has taught half of the spring semester 3-credit BMB 301 lecture course (Dr. Sukalski taught the other half) and the entire fall semester BMB 401 course. Dr. Lambeth officially re-retired as of May 15, 2012. Prior to the piloting of BMB 301 in the SCALE UP classroom, Dr. Shabb will create all new materials based on recent primary literature. For BMB 401, pre-, in-, and post-class activities will be created for 100 minute class sessions which will run MWF from August 22 – October 21, 2012. These two initiatives will consume considerable effort on the part of Drs. Sukalski and Shabb. It was decided by the chair to pursue the undergraduate initiatives because they are pedagogically the right thing to do. Hopefully the new chair will value undergraduate education and these initiatives will serve as a foundation for informing instructional design changes elsewhere within the SMHS (see next paragraph).

No progress has been made since our first formal attempt in 2010 to garner institutional support for our involvement in BMB 401 and 403 (lab). These two courses were established in 2004 at the request of the Chemistry Department to support a BS in Chemistry with a Biochemistry Option. In August of 2009, a letter of support was written for a BS in Biology with a major in Molecular and Integrative Biology. The Basic Life Science Option would require BMB 301 and the Enhanced Applied Life Science Option would require completion of BMB 301, 401, and 403. In March and April of 2010, meetings held with the chairs of Chemistry and Biology and with Arts and Sciences Dean Martha Potvin resulted in no commitment to the courses. The SMHS Associate Dean for Research was approached regarding permission for the lab and no encouragement was forthcoming. The one positive outcome of the discussions was that we did apply for and were awarded a lab fee which covered most of the cost of the consumables for the lab. BMB 403 will be taught as it was in 2011 by Drs. Shabb and Danping Guo in the central space on the second floor.

In the transition to a single-department basic science structure, there must be considerable thought given to the roles of these courses (and many others in the basic sciences) and the relationship of the SMHS to the rest of the university. Hopefully they will be recognized as an essential educational partnership between the SMHS and the rest of the institution and a more equitable return for faculty time and provision of space for labs can be worked out. If we decide such courses are no longer in our mission, adequate time has to be allowed for the university to accommodate our withdrawal from participation. Students with programs of study are in the pipeline and the institution as a whole is responsible for living up to its commitment to them.

Assessment of Student Learning - Check Plan

X This is the most current plan
I am submitting an updated plan
Other
• For undergraduate programs or for programs in non-academic departments:

  • For which goals (of those listed in your plan) was assessment information collected this year?

  • Which assessment methods did you use to collect information this year?

  • Please provide some of your results from the methods that were used this year. (You don’t need to paste in large amounts of data, but provide examples or a summary of results/findings that were interesting or useful.)

  • Has your department made use of this assessment information to inform changes? Think about changes in individual courses, curriculum, assessment methods, departmental planning. Have you made use of assessment information collected in previous years to inform changes that are underway as of this year? To find out if changes made in a previous year “worked”? If so, please describe any or all of these “loop-closing” activities.

  • Overall response to questions in this section (enter only if you did not separate out earlier questions).

BMB does not offer an undergraduate major or minor however we offer three courses which support majors within Arts and Sciences (Forensic Science; Chemistry, Biochemistry emphasis; and Biology-Molecular, Cellular, and Developmental Biology Option); the College of Nursing (Nutrition and Dietetics); and the SMHS (Medical Laboratory Science; and Cytotechnology). The impending revision of BMB 301 and the creation of new materials for BMB 401 have previously been discussed. The goal for 2012 is to create new teaching materials for BMB 401 and to convert the large enrollment BMB 301 to small group, inquiry based format. In March of 2012, we competed successfully through the Office of Instructional Development for space in the UND SCALE UP classroom for 2013. The application of small group active learning to biochemistry is a growing national trend. It is far more effective that simple lecturing in emphasizing the development of critical thinking skills, group problem solving, and independent learning.

• For certificate programs:

  • For which goals (of those listed in your plan) was assessment information collected this year?

  • Which assessment methods did you use to collect information this year?

  • Please provide some of your results from the methods that were used this year. (You don’t need to paste in large amounts of data, but provide examples or a summary of results/findings that were interesting or useful.)

  • Has your department made use of this assessment information to inform changes? Think about changes in individual courses, curriculum, assessment methods, departmental planning. Have you made use of assessment information collected in previous years to inform changes that are underway as of this year? To find out if changes made in a previous year “worked”? If so, please describe any or all of these “loop-closing” activities.

  • Overall response to questions in this section (enter only if you did not separate out earlier questions).

• For law, medicine, and graduate degree programs:

  • For which goals (of those listed in your plan) was assessment information collected this year?

  

  Focus was on Learning Goal 1, specifically Objectives 1.1 and 1.3.

  Mission Statement: The PhD Program in the Department of Biochemistry and Molecular Biology will provide formal classroom instruction and mentored research experiences that enable and encourage students to become competent, creative, and independent biomedical scientists.

  Student Learning Goal 1: PhD graduates will have a foundational knowledge of biochemistry and molecular biology.

  Objective 1.1: Students shall have at their command a broad knowledge of biochemistry and molecular biology. This knowledge shall be sufficient to provide the student
a strong foundation for scientific inquiry and provide flexibility for career development.

Objective 1.3: Students shall develop the ability and demonstrate a commitment to use research literature and other resources to keep abreast of major scientific developments and to acquire a working knowledge base in any relevant area. Students shall develop the ability to build on their existing knowledge base as necessary to develop their areas of specialization and to promote integration of knowledge across scientific disciplines.

Student Learning Goal 2: PhD graduates will have the ability to conduct meaningful scientific inquiry.

Student Learning Goal 3: PhD graduates will possess communication skills necessary to relate the results of their scientific queries clearly and convincingly to others.

Student Learning Goal 4: PhD graduates will demonstrate professional and ethical scientific behavior, including a commitment to continual professional development.

• Which assessment methods did you use to collect information this year?

• Please provide some of your results from the methods that were used this year. (You don’t need to paste in large amounts of data, but provide examples or a summary of results/findings that were interesting or useful.)

• Has your department made use of this assessment information to inform changes? Think about changes in individual courses, curriculum, assessment methods, departmental planning. Have you made use of assessment information collected in previous years to inform changes that are underway as of this year? To find out if changes made in a previous year “worked”? If so, please describe any or all of these “loop-closing” activities.

• Overall response to questions in this section (enter only if you did not separate out earlier questions).

Assessment 1: What Did We Learn from the Comprehensive Exams Administered in June of 2012?

BMB Graduate Faculty Meeting July 9, 2012

Five second year PhD students took the Comprehensive Exams in June of 2012. This was the largest group in recent history to take the exam at one time and gave us an inter-student comparison that was not usually the case. These particular students had previous satisfactory accomplishments in all their class work, and had demonstrated serious, sustained preparation efforts for the exam (as observed by various faculty).

The students had been told that they were expected to be well versed in material found in Fundamentals of Biochemistry: Life at the Molecular Level (3rd edition, Voet, Voet and Pratt 2008) and in the topics in cell biology presented in BIMD 500 and any advanced courses they had taken. They were expected to use material at that level to answer the questions on the exam. They were told that the question format would be predominately problem solving and that the ability to work problems at the end of the chapters in the above text would be THE best way to prepare for the exam. The written exam covered the topics outlined to students. It was prepared by Dr. Shabb utilizing material from Foundation of Biochemistry 2nd edition Loetscher and Minderhout a POGIL style method. It was felt that the material therein was truly foundational.

• The students did not do as well as we had hoped. As the content of the exam was quite basic and the students had worked hard to prepare, it seemed to us that the mismatch between the ways they prepared and the way in which they were questioned may have accounted for at least some of the poor showing. There is literature to support this assertion.

Regarding the Oral Exam, the previous method of rather diverse, wide-ranging questions was felt to be ineffective in helping us truly access the capability of the students to use their existing knowledge to design strategies to solve problems. Therefore the format was changed from the usual general exam to a focused group problem solving session with contributions evaluated by at least two faculty. All BMB faculty were invited to observe. And most did for at least a portion of the time.

Regarding the structure and content of the Oral Exam, three, three-hour sessions were held on June 21, 22 during which the students worked as a group of five to answer guided questions constructed based on two literature papers. It was expected that the group would demonstrate the ability to

• Identify the resources and information needed to solve the problem
• Access appropriate resources and extract relevant information
• Use the acquired information and critical thinking skill to “solve” the problem
• As individuals, work effectively within the group.

Initially students struggled with the format, again possibly because they had little practice at it. Our BMB 401 students from the fall of 2011 were much more functional in group which is not surprising as they had 40 plus hours of experience in working together in a small group, solving problems in this manner.

After the exam a debriefing session was held with the students. The faculty reached the following conclusions:

• In order to further develop their critical thinking skills, our students need more practice at applying fundamental knowledge of biochemistry and molecular biology in a guided inquiry manner.

• In the debriefing session all students agreed with a statement by one that I was a “better biochemist after taking the exam.” In other words the process of studying for the exam and struggling with the material as a group in the Oral Exam, they learned something about problem solving. They agreed that there were some “light bulb moments” in the course of the oral where something new became evident to them. They were surprised by these moments after all the studying that they had done previously.

We will be looking for a place to do this. BIMD 500 would be the ideal forum but that is not our call to make. We will consider including guided inquiry learning in some of our BMB 533 sections.

• Going back to the old Comprehensive exam format is pointless. We don’t get good information about students’ abilities. In addition, the process of preparing for the exams whether by brute memorization or by working textbook problems, has not helped the develop the critical thinking and problem solving skills that a biochemist needs to have. It was decided to offer a section of BMB 533 on Grant Writing in the spring of 2012. This will allow for a focused review of pertinent aspect of the literature. Following that course students scheduled to take their Comprehensive Exams will expand upon what had been done there and defend their aims and methods to the BMB faculty as their Oral Exam.

Assessment 2: BIMD 500 Status

As reported previously, the effectiveness of the interdisciplinary BIMD 500: Cellular and Molecular Foundations of Biomedical Science course in contributing to BMB Learning Goal 1 has been called into question. BIMD 500 (6 credits) is taken by all of the BMB first year MS and PhD graduate students as well as students from the other three basic science departments. The SMHS Graduate Curriculum Committee (GCC, predecessor to the BSGCC), with representation from the four basic science graduate departments, is responsible for oversight of the course. In spring 2010, a Biomedical Sciences Questionnaire was distributed to faculty and graduate students from the basic science graduate programs within the SMHS seeking feedback regarding BIMD 500. The results of the survey indicated that this course should be revised to more adequately meet the requirements and expectations of both the faculty and students for a foundational experience in graduate education. Findings suggested that many faculty believed that BIMD 500 did not effectively develop critical-thinking and problem-solving skills and that it did not deliver the appropriate level of content for an introductory graduate level course in the basic biomedical sciences.

Drs. Joyce Ohm, Min Wu and Keith Henry (PPT) were charged by the GCC with creating and implementing a Molecular Biology Pilot Module in the course utilizing active learning principles (in the POGIL model) during the fall of 2010. Following completion of the module and analysis of the results, the GCC was in unanimous agreement that the current format of BIMD 500 should be discontinued and replaced by a year-long curriculum utilizing principles that guided the recently completed Molecular Biology Pilot Module. The GCC outlined a proposed curriculum and identified directors of the four courses to replace 500. Implementation of a total first year curriculum revision was put on hold when the proposal was not accepted by the faculty in two of the four departments in a June 2011 vote. Since that time there have been incremental, faculty-specific changes in the teaching format. Under the leadership of the GCC and Dr. Ken Ruit, BIMD 500 Course Director, faculty members participating in the course in fall of 2011 were encouraged to hold students accountable for reading and preparation prior to class and to incorporate pedagogies beyond the standard lecture for their sections and the Molecular Biology Module piloted in 2010 was revised and repeated. The much needed total revision of the interdisciplinary first year curriculum into a cohesive whole awaits the involvement of the new chair in a somewhat uncertain timeline.
Assessment of UND Priorities

- Enriching student learning experience

Faculty members of the department are committed to providing mentored laboratory research experiences for undergraduates. For the first time in the fall of 2011, we designed and implemented a formal recruitment and selection process to place undergraduates in the labs of interested BMB faculty under the title of BMB 494 Directed Studies. We advertised through instructors in foundational courses in biology and chemistry. Most of the BMB faculty had one or more undergraduate students participating in mentored lab experiences through BMB 494 and Chemistry 492. In addition, BMB faculty participated in the existing INBRE/SMHS undergraduate summer research programs including STEER, REFUNDU, and REU. Many of the students who began BMB 494 in the spring or summer of 2012 will register again for the fall.

Drs. Shabb and Sukalski convened a meeting March 26, 2012 with individuals and departments heavily involved in pre-medical education and advising. Faculty from BMB, Biology, Chemistry, Kim Ruit, Undergraduate Pre-health Advisor; Dr. Susan Splichal, SMHS Interim Director of Admissions; and Dr. Ken Ruit AMHS Assistant Dean for Undergraduate and Graduate Education met to discuss the implications of the MCAT 2015. This discussion is ongoing as we seek to provide the best possible preparation for UND undergraduates to prepare for medical and other pre-professional health-related programs.

Drs. Shabb and Sukalski were awarded a UND Office of Instructional Development grant to participate in the SCALE UP classroom in the Spring of 2013. They both attended the SCALE-UP Workshop May 14 – 16, 2012 (UND Office of Instructional Development) and Dr. Sukalski attended the “National Academies Northstar Summer Institute on Undergraduate Education in Biology” June 11-16, 2012 at the University of Minnesota, Twin Cities. Hopefully this initiative will serve as a foundation for informing instructional design changes elsewhere within the SMHS and inform the design of new educational space in the future.

- Facilitating collaboration

As discussed previously, several BMB faculty participates in the cross-disciplinary Epigenetics Group that has been meeting on the UND campus since 2010. Members of the group come from the basic science departments in the SMHS in addition to Biology, GF Human Nutrition Research Center, Nursing, and Computer Science. They are preparing a collaborative COBRE proposal and are planning for an Epigenetics Symposium to be held on the UND campus in November of 2012. The group planned and submitted a COBRE proposal (Roxanne Vaughan PI) that was scored very highly and has a good chance of being funded this cycle. Jonathon Geiger is a Senior Advisor to the COBRE and was instrumental in preparing the proposal. Brij Singh was the primary writer of the proposal and is a member of the internal advisory board. Project leaders are Archana Dhasarathy (BMB), Joyce Ohm (BMB), Sergei Nechaev (ACB), Cindy Anderson (Nursing), Lucia Carvelli (PPT).

Drs. Julia Zhao, Chemistry and Min Wu, BMB, have a longstanding collaborative research effort. Combining Dr. Zhao’s interest is in the development of novel optical nanomaterials and Dr. Wu’s interest is in the evaluation and application of these materials in biomedical areas the two of them have written at least six grant proposals, published of two significant research papers and two review papers that have received international media attention and citations. These researchers have also collaborated in four funded research projects. The most recent a DoD USAMRAA grant of $2.45 million dollars. This grant allows them to study the toxicity and applicability of nano-fiber based hemostats for soldiers and the modification of the nanofiber surface for immobilization of medicines. They have co-advised three doctoral students and a research scientist to date. Dr. Wu also is a long-time collaborator of Dr. H. Zeng from the GF HNRC and with the Infectious Disease group from the SMHS MI department.

Dr. Shabb in his role as Director of the INBRE Proteomics Core Facility (Donald Sens, PI), works to enhance the research capacity of SMHS and other NDUS faculty. Dr. Shabb has collaborated with a variety of investigators and written ten letters of support for proteomics on grant applications over the past three years (from three different departments in the UND SMHS). Three projects eventually got funded but the proteomics aspects of the three are not currently active. In the same three year period the Proteomics Core has collaborated with eight other PIs (from three different institutions) to generate preliminary data for their projects.

The following BMB collaborations are also of note:

- Between them, Foster, Singh, Ohm, Wu, and Vaughan had two interdisciplinary UND COBRE Neuroscience Pilot Grants involving other SMHS faculty from ACB and PPT.
- Drs. Dhasarathy, BMB, and Nechaev, ACB, secured a $46,600 ND EpSCOR 2012 Equipment grant to purchase a state of the art Covaris Sonicator. This instrument will be valuable to anyone in the epigenetics working group needing to fragment RNA, DNA, or cross linked chromatin prior to ChiP, next-generation sequencing, or other downstream applications.
- Dr. Xie has an active collaboration with Kate Claycombe, PhD, at the GF HNRC and with Kurt Zhang, PhD, (Bioinformatician) in Pathology.

- Encouraging gathering
The students and faculty from BMB took part in the SMHS Biomedical Sciences Research Retreat in October 2011. Drs Ohm and Foster served on the planning committee. Dr. Dhasarathy has taken the lead on planning for Epigenetics Conference to be held November 15, 2012 in the Memorial Union. Some students and faculty take part in the Friday afternoon gathering of researchers.

- Enhancing the quality of life of faculty and staff

Dr. Sukalski regularly attends the annual American Association of Medical Colleges’ Group on Faculty Affairs meeting and strives to apply what she learns there about best practices in faculty development and leadership training, faculty wellness, and diversity in her role as Interim Chair. She also participated in the UND New ‘Chairs Leadership Cohort’ which facilitates academic leadership development (sponsored by the Office of the Provost & Vice President for Academic Affairs). On January 10, 2012 she hosted a get-acquainted luncheon for (relatively) new basic science faculty:

- Anatomy and Cell Biology: Sergei Nechaev
- BMB: Archana Dhasarathy, Jamie Foster, Joyce Ohm, Linglin Xie
- Microbiology and Immunology: Catherine Brissette, Bibhuti Mishra, Jyotika Sharma
- PPT: Lucia Carvelli, Xuesong Chen, Mikhail Golovko, Keith Henry

Renee Mabey, Professor of Physical Therapy moderated the session.

In 2012/2013 Dr. Sukalski will orient BMB faulty and graduate students to their responsibilities in reporting sexual assaults as per the Title IX Dear Colleague Letter (the U.S. Department of Education (ED) Office of Civil Rights (OCR) Letter released April 4, 2011).

- Expanding the presence and impact of the university beyond the campus

Drs. Shabb and Wu both have research contracts from NovaDigm Therapeutics, Inc., Los Angeles.

Dr. Shabb served as a Poster Judge at the ASBMB Regional Conference held at in October 2011 at Minnesota State Moorhead.

Dr. Dhasarathy and two BMB graduate students served as a judge for two sessions at the North Dakota State Science and Engineering Fair held on March 30, 2012 in Grand Forks.

Dr. Dhasarathy organized a group of graduate students (five from MI and 2 from BMB) to present a module on DNA and the Genetic Wheel at the SMHS Science Day (April 14, 2012). Previously all of the activities at this annual event had been conducted by medical students.