



K-State 2025 Strategic Action and Alignment Plan

College or Major Unit: Arts & Sciences

Department: Biochemistry & Molecular Biophysics

1. What are your Department's mission and vision and how does your organization contribute to achieving the University's and your College's/Major Unit's vision for K-State 2025?

It's desirable to separate our professional goals from our academic responsibilities. The collective mentality of our faculty is to advance the accomplishments of our research programs, and thereby enhance the overall reputation of BMB and K-State. As a group of scientists, we anticipate that our efforts will have an immediate, tangible impact on K-State's recognition as a research institution. We achieve success through our publications, that establish national and international recognition for our laboratories, which promotes extramural funding for our programs and professional opportunities for our personnel. However, we do not separate these activities from our obligations in the university environment: our responsibilities are to meet teaching obligations, excel at educating students and launch scientific and profession careers. K-State profits from both types of faculty endeavors: (i) from an improving reputation as a research institution; (ii) as a university that provides a fundamentally sound education in the areas of biochemistry, biophysics and molecular biology.

2. What are your Department's key strategic activities and outcomes?

3. Identify [in brackets] which of your Department's strategic outcomes are directly linked to your College's/Major Unit's outcomes. (If your Department or similar unit is not in a College or Major Unit, skip this question.)

All of these objectives relate directly to the advancement of research and teaching described in question 1. The scope of faculty expertise, faculty satisfaction, size and quality of the graduate student population, and the suitability of our facilities for research activities are the core attributes of our scientific and educational activities.

Key Activities	Short Term (2013 - 2015) Key Outcomes	Intermediate (2016 - 2020) Key Outcomes	Long Term (2021 - 2025) Key Outcomes
<i>What we plan to do...</i>	<i>What we expect to happen...</i>	<i>What we expect to happen...</i>	<i>What we expect to happen...</i>
Improve the graduate study environment	Stipends will rise; student qualifications will improve; student numbers will increase;	PhD and MS degrees will increase; research productivity will improve (publications, external grants); total student number will rise to 40	PhD and MS degrees will increase; research productivity will improve (publications, external grants); total student number will rise to 50
Advance interactions with other K-State departments and NBAF	Acquisition of externally funded (NIH, NSF) doctoral training programs.	Acquisition of externally funded (NIH, NSF) doctoral training programs.	
Addition of new faculty lines and recruitment of scientists in new areas	Adjunct appointments of KSU faculty and NBAF scientists in BMB;	Adjunct appointments of KSU faculty and NBAF scientists in BMB;	Increased critical mass of personnel, instrumentation and scientific resources
Increase faculty salaries	Acquisition of externally funded (NIH, NSF), multi-investigator research and training programs.	Acquisition of externally funded (NIH, NSF), multi-investigator research and training programs.	
Enhancement of existing research space, or acquisition of new space	Hiring of new faculty in novel areas of biochemical, biophysical and molecular biological research	Increase overall BMB faculty size from 14 to 17	Increase overall BMB faculty size from 17 to 20
	Eliminate compression and inversion at the Associate Professor level	Eliminate compression and inversion at the Professor level	Nationally competitive salaries at all levels
	Renovation of Burt Hall laboratories (Geisbrechts, Tomich, Reeck)	Renovation of Chalmers Hall laboratories (electrical, plumbing,	Acquisition of new laboratories in Chalmers Hall, or in new

4a. What resources and/or opportunities exist for your Department to achieve its vision and outcomes?

See combined response to question 5

4b. What resources and/or opportunities are needed for your Department to achieve its vision and outcomes?

See combined response to question 5

5. How do you propose to acquire the resources needed for your Department to accomplish its vision and outcomes?

The BMB faculty completed a round of strategic planning for departmental development in the context of K-State 2025. This included a questionnaire about our objectives, a faculty meeting to discuss the issues, and additional exchanges by email. What follows is a summary of points from these discussions, that constitutes a combined response to questions 4a, 4b and 5.

1. Graduate support and training. I present our opinions in the order of their priority to our future, and graduate support comes first. Numerous faculty, including some of our most productive researchers, stated that poor graduate student support is a primary threat to departmental success. We cannot yet compete for the best post-doctoral researchers, who seek out the most distinguished research institutions for their training. So, many or most of our scientific accomplishments involve the experiments of graduate students. We have the skill and willingness to train them, but we require a steady pool of qualified graduate applicants. Low GTA/GRA support (\$21,821 in 2012) is a focal point of the KSU academic equation. In relation to peer institutions KSU BMB ranks in the lower half for GTA/GRA support, ~ 25% below salaries in some other Big 12 programs (Table 1). It's difficult to achieve departmental and KSU 2025 goals without top grad students. The \$22,000 annual stipend drops to \$18,000 when students pay their tuition, bringing their overall compensation to a level of about \$7.20 per hour. We can argue that the quality of our training program will ultimately compensate for low pay during graduate school, but it's hard to sell this argument when the discrepancy is too large. I hope we will find ways to increase our stipend levels. Here are some conceivable approaches.

a. Tuition waivers. A full tuition waiver will increase grad pay ~\$4000 per year. The current absence of this benefit for our graduates students creates undue financial hardship on them, and makes graduate recruitment difficult as a result of the availability of tuition waivers at other peer institutions.

b. Private fundraising toward graduate fellowships. If we identify a few people or entities that will donate \$25-30 K for a 3-5 year period, we can create a training fellowship in their/its name, and appoint our best students to these special positions. This approach allows us to divide the remaining GTA/GRA funds among the other students, increasing their annual salaries.

c. Supplementation of existing GTA/GRA funds from research grants. This year A&S allowed individual faculty to increase grad stipends by supplementation from their research grant funds or other sources (e.g., start-up funds). This approach has some drawbacks, but it provides a more realistic, higher level of support for hard-working graduate assistants.

d. Cross-disciplinary graduate training grants. When researchers in multiple KSU departments work in a common area, cross disciplinary graduate training programs may create new resources. For example, collaboration of BMB faculty studying plants, insects or agricultural disease vectors with other departments (Biology, Chemistry, the Vet School) may lead to program project grant applications to NSF, USDA or NIH. Successful training programs in areas of K-State research strength will facilitate recruitment of high quality doctoral candidates, increase their salaries and potentially provide connections with relevant academic and commercial networks. Besides agricultural research, projects involving cancer biology, biophysics and infectious disease and other areas are also potentially viable.

The competitiveness of multi-investigator program project grant applications hinges on the funding levels of participant faculty. Individual research support is the cornerstone of faculty eligibility for such applications, so it's a priority to improve individual funding rates from national external sources. Secondly, it's beneficial to recruit faculty with track records at NIH, NSF or USDA, who may participate in these multi-investigator applications for grad training or the acquisition of major, multi-user instrumentation. This year BMB accomplished the latter goal with the recruitment of Brian and Erika Geisbrecht, and I hope that we will recruit more established researchers in ensuing years.

2. Department size. With the addition of Brian and Erika, BMB has 14 tenured/tenure-track faculty, 4 research faculty, 5 post-doctoral associates and 32 graduate students. Within the next decade we expect global growth in molecular biosciences, and we aspire to 5-6 additional faculty lines that strengthen our existing research or add new areas to our combined expertise. This growth will lead to increases in research faculty, post-doctoral associates and graduate students. Which areas of research will we emphasize in this expansion? The decision involves many factors, including our academic curricula (see below), but some topics of interest are signal transduction, plant and animal infectious disease, single-molecule biophysical analyses, metabolomics/glycomics, neurobiology/chemistry, eukaryotic genetics, membrane biochemistry.

a. Interactions with the National Bio and Agro-Defense Facility (NBAF). In light of NBAF, agriculture-related infectious disease may constitute our greatest opportunity for advancement and national recognition. Although we do not yet know the extent of possible interactions and collaborations with the planned facility, the influx of scientific expertise in areas relevant to our mission is unprecedented. The NBAF community is to research on infectious disease what Cold Spring Harbor Laboratory was to research on nucleic acids. We will provide a local network of expertise in biophysics and biochemistry that is accessible to the scientists and programs NBAF will relocate here. Both K-State academic departments and NBAF programs may profit from such interactions; we embrace this opportunity, and we will afford NBAF scientists the opportunity to affiliate with BMB.

b. Retention of existing faculty. Insufficient faculty to achieve departmental goals and create programs is a potential weakness in the KSU environment. The flip side of the influx of new researchers is loss of distinguished faculty to other institutions as we strive toward national and international recognition. This threat relates to (i) salary compression and lack of faculty merit raises, (ii) low faculty development resources, (iii) lack of internal grants and incentives, (iv) faculty spouse careers. These obstacles involve the economic/political climate for higher education in KS. We expect the KSU administration to promote university research in a way that maximizes state support, and hope that K-State will stand ready to provide financial resources to stem the loss of our top professors.

c. Breadth of teaching expertise. Our first responsibility is to meet teaching obligations and excel at educating students. This means planning faculty composition to obtain a breadth of expertise that covers desired instructional areas. To some extent, departmental research originates from this teaching foundation, by hiring scientists whose capabilities meet departmental teaching needs. Besides a wide scope of biochemical/biophysical expertise, we strive to maximize our research recognition: external funding, national awards, tenure, appointment to external organizations and academies. However, more departmental faculty may also be a double-edged sword. Additional faculty dilute resources among more people, creating fewer opportunities for individuals, potentially causing dissatisfaction among both faculty and administrators. If resources are in short supply, then “less is more” may ring true for departmental size. In future planning we must balance these opposing considerations.

d. Graduate student population. How many graduate students are needed to teach our undergraduate classes, and how many graduate assistants do we desire in faculty laboratories? These two numbers, respectively, set our minimal and maximal graduate student population. Extrapolating from this basis leads to 30-45 BMB graduate students, that will distribute within laboratories as a result of the usual variables, including extents of funding, faculty personalities and publication rates.

3. Departmental Facilities. BMB currently occupies 10 laboratories in Chalmers Hall (including an NMR facility) and 4 laboratories in Burt Hall (including a biotechnology core facility). To expand in size we require additional faculty laboratory and office space. The Chalmers Hall laboratories are functional, reasonably well equipped and safe, but need upgrading for improved electrical, HVAC and water supply needs. The Burt Hall laboratories are old, to some extent outdated for the same services (leading to safety concerns), but they are more spacious, comfortable and aesthetic. We are investing > \$100K in the renovation of the Geisbrechts' Burt Hall labs, and we anticipate a restoration that will support their research for the foreseeable future. I hope to accomplish similar renovations to our other Burt Hall labs in future years.

a. Potential additional space in existing facilities. Chalmers Hall is currently divided among faculty from BMB and Biology. One of our departmental objectives is to house all our faculty in a common, well equipped, modern facility. The entirety of a refurbished Chalmers Hall would meet this expectation, but such a plan involves new space for the biology faculty located therein.

b. Additional space in new facilities. In 2012 the K-State Campus Master Plan Task Force endorsed construction of new academic and research space that may accommodate the needs of some or all BMB faculty. At present we have no idea of when such plans may become a reality.

6. How does your plan link to the K-State 2025 University Benchmark Metrics, Common Elements, and Thematic Goals, Outcomes, and Metrics? (See below)

6. Departmental Links to K-State 2025 University Benchmark Metrics, Common Elements, and Thematic Goals, Outcomes, and Metrics

Links to Benchmark Metrics
B-1 - Total research and development expenditures B-3 - Number of national academy members B-4 - Number of faculty awards B-5 - Number of doctorates granted annually B-6 - Freshman-to-sophomore retention rate B-7 - Six-year graduation rate B-8 - Percent of undergraduate students involved in research

Links to Common Elements
CE-1 - Communications and Marketing CE-3 - Diversity CE-4 - External Constituents CE-5 - Funding CE-6 - International CE-8 - Technology

Links to University Thematic Goals, Outcomes, and Metrics			
Links to 2025 Thematic Goals and Metrics	Links to Short Term Outcomes (2011 – 2015)	Links to Intermediate Outcomes (2016 – 2020)	Links to Long Term Outcomes (2021 – 2025)
<p>T1 - Research, Scholarly and Creative Activities, and Discovery (RSCAD)</p> <p>Theme 1 Metrics:</p> <p>T1-1 - # of interdisciplinary research projects, institutes, and centers</p> <p>T1-2 - Total sponsored extramural funding expenditures</p> <p>T1-3 - # of juried, adjudicated, or externally vetted performances, shows and designs</p> <p>T1-4 - # of refereed scholarly publications per academic year and allocated faculty member</p> <p>T1-5 - Total international research and development expenditures</p>	<p>T1-A - Increased intellectual and financial capital to support RSCAD</p> <p>T1-B - More clusters/centers of collaborative RSCAD focus</p> <p>T1-C - Increased funding for investigator-based research, research centers, and graduate training grants</p> <p>T1-D - Tuition waivers for all GRAs</p> <p>T1-E - Competitive compensation and support available to GRAs, GTAs, and GAs</p> <p>T1-F - Enhanced and systematic approach for UG research</p> <p>T1-G - Successful recruitment, retention, evaluation, compensation, and rewards strategies in place to support RSCAD needs</p> <p>T1-H - Enhanced visibility and appreciation for research, discovery, and scholarly and creative activities</p>	<p>T1-I - Intellectual and financial capital in place for expanded RSCAD efforts</p> <p>T1-J - Greater proportion of nationally and internationally recognized award-winning faculty in RSCAD programs</p> <p>T1-K - Nationally and internationally recognized research centers</p> <p>T1-L - Recognized for prominent and productive placement of our graduates</p> <p>T1-M - Increased participation by undergraduates in expanded opportunities in research</p>	<p>T1-N - Fifty nationally recognized K-State researchers, a high proportion of which are members of their national academies</p> <p>T1-O - Extramural funding competitive with our benchmark institutions</p> <p>T1-P - Research and development expenditures competitive with benchmark institutions</p> <p>T1-Q - Competitive amongst our peers in the percentage of undergraduates involved in research</p>

Links to University Thematic Goals, Outcomes, and Metrics			
Links to 2025 Thematic Goals and Metrics	Links to Short Term Outcomes (2011 – 2015)	Links to Intermediate Outcomes (2016 – 2020)	Links to Long Term Outcomes (2021 – 2025)
<p>T2 - Undergraduate Educational Experience (UEE)</p> <p>Theme 2 Metrics:</p> <p>T2-1 - # and % of undergraduate students participating in a meaningful international experience</p> <p>T2-2 - # and % of undergraduate students completing an experiential learning experience</p> <p>T2-3 - Total funding awarded for undergraduate scholarship support</p> <p>T2-5 - # of students awarded national and international prestigious scholarships</p> <p>T2-6 - % of undergraduate enrollment by demographic group</p> <p>T2-7 - Student satisfaction and utilization rates</p>	<p>T2-B - Engaged students benefitting from high impact educational practices used by excellent faculty and staff across the university</p> <p>T2-C - Increased participation by undergraduates in expanded opportunities for meaningful research</p> <p>T2-D - Successful integration of undergraduate education and meaningful research is standard practice</p> <p>T2-E - Effective evaluation practices that recognize and reward teaching, advising, and life-long learning/professional development</p> <p>T2-G - Successful recruitment and retention strategies that address our entire student population</p> <p>T2-H - Improved six-year graduation rates and retention ratios</p>	<p>T2-I - Integrated learning communities experienced by students, faculty, and staff that promote student success within a culture of excellence</p> <p>T2-J - Excellent reputation for high quality teaching and advising that prepares students for their professional, community, social, and personal lives</p> <p>T2-K - Superior and diverse faculty recognized for teaching excellence</p> <p>T2-M - Increased undergraduate contributions in the creation of scholarship through research</p> <p>T2-N - Ongoing improvement of six-year graduation rates and retention ratios</p>	<p>T2-O - An undergraduate educational experience recognized as one of the best among the nation's Top 50 Public Research Universities</p> <p>T2-P - Faculty teaching and advising awards comparable to our benchmark institutions</p> <p>T2-Q - Freshman to Sophomore retention ratios comparable to benchmark institutions</p> <p>T2-R - Six-Year graduation rates comparable to benchmark institutions</p>
<p>T3 - Graduate Scholarly Experience</p> <p>Theme 3 Metrics:</p> <p>T3-1 - # and % of graduate students with assistantships, endowed scholarships, and fellowships</p> <p>T3-2 - Total funds awarded for graduate assistantships, endowed scholarships, and fellowships</p> <p>T3-3 - # and % of graduate programs offering competitive compensation and support packages</p> <p>T3-4 - # of private/public sector</p>	<p>T3-A - Competitive compensation and support available for GRAs, GTAs, and GAs</p> <p>T3-B - Tuition waivers for all GRAs</p> <p>T3-C - Engaged graduate students integrated in university life with enhanced visibility and appreciation</p> <p>T3-D - Outstanding mentoring for our graduate students</p> <p>T3-E - Expectation of excellence for the graduate scholarly experience</p>	<p>T3-I - Increased participation by our graduate students in unique high level learning and experiential training</p> <p>T3-J - Expanded reputation for outstanding graduates with the critical skill sets needed to excel in their careers in a global environment</p> <p>T3-K - Increased funding for graduate research and teaching</p> <p>T3-L - Increased number of nationally and internationally recognized award-winning graduate faculty</p>	<p>T3-N - National and international reputation for outstanding graduates with demonstrable career success</p> <p>T3-O - World-class reputation as a preferred destination for outstanding graduate students</p> <p>T3-P - Stable funding for graduate research and teaching competitive with benchmark institutions</p> <p>T3-Q - Doctorates Awarded comparable with benchmark institutions</p>

Links to University Thematic Goals, Outcomes, and Metrics

Links to 2025 Thematic Goals and Metrics	Links to Short Term Outcomes (2011 – 2015)	Links to Intermediate Outcomes (2016 – 2020)	Links to Long Term Outcomes (2021 – 2025)
<p>partnerships supporting graduate experiential training opportunities</p> <p>T3-5 - # of graduate students participating in a unique high level learning and experiential training</p> <p>T3-6 - # of graduate terminal degrees awarded</p> <p>T3-7 - Total graduate students enrolled by demographic group and degree type</p> <p>T3-8 - Graduate student satisfaction and utilization rates</p>	<p>T3-F - Increased capacity to secure funding for graduate research and teaching</p> <p>T3-G - Broader spectrum and greater overall number of courses offered at the graduate, and especially at the PhD level</p> <p>T3-H - Expanded partnerships with industry and government to provide high level learning and experiential training opportunities for graduate students</p>	<p>T3-M - Increased number of Doctorates Awarded</p>	
<p>T4 - Engagement, Extension, Outreach and Service</p> <p>Theme 4 Metrics:</p> <p>T4-3 - # of partnerships by sector and geographic boundary supporting collaborative research, education, and engagement</p> <p>T4-4 - # of engagement activities and programs disaggregated by geographic boundaries</p> <p>T4-5 - # of participants involved in community-based research and outreach projects</p> <p>T4-6 - Economic impacts on rural and urban communities in Kansas</p>	<p>T4-B - Increased participation by undergraduates in expanded opportunities for meaningful Engagement experiences</p> <p>T4-C - Increased recognition of our services as a source of expertise, information, and tools for disciplines worldwide</p> <p>T4-D - Increased numbers and diversity of faculty and staff participating in Engagement</p> <p>T4-F - Recognition as leaders in Engagement within our state and nation</p>	<p>T4-H - Exposure on a national level as a leader/partner engaged in significant social, political, health, economic and, environmental issues</p> <p>T4-K - Increased appreciation by K-State graduates for lifelong involvement in engagement and service</p> <p>T4-M - Preferred destination for faculty, staff, and students who value Engagement as integral to their academic and personal lives</p>	<p>T4-N - Nationally recognized as a leader in and model for a re-invented and transformed land -grant university integrating research, education, and engagement</p> <p>T4-O - Nationally and internationally recognized as leaders in Engagement on a global scale</p> <p>T4-P - Recognized as a leader in Engagement reaching both rural and urban communities</p>
<p>T5 - Faculty and Staff</p> <p>Theme 5 Metrics:</p> <p>T5-1 - # of national and international faculty awards</p> <p>T5-2 - # and % of faculty with endowed chairs, professorships, and</p>	<p>T5-A - Total compensation competitive with aspirant university and regional employers for faculty and staff in high priority areas</p> <p>T5-C - Career-long learning recognized by the university and its employees as a shared value and</p>	<p>T5-E - Total compensation competitive with aspirant university and regional employers for all employees</p> <p>T5-F - Faculty and staff current with developments in their fields and the skills needed to achieve excellence in</p>	<p>T5-H - Talented and high performing, diverse workforce recognized for excellence and award-winning faculty and researchers</p> <p>T5-I - Stable funding available for recruitment and retention of top level faculty and staff</p>

Links to University Thematic Goals, Outcomes, and Metrics			
Links to 2025 Thematic Goals and Metrics	Links to Short Term Outcomes (2011 – 2015)	Links to Intermediate Outcomes (2016 – 2020)	Links to Long Term Outcomes (2021 – 2025)
fellowships T5-3 - Competitive compensation packages for faculty and staff T5-4 - # and % of faculty and staff participating in international experiences T5-5 - % of tenure/tenure-track faculty by demographic group T5-6 - % of fulltime staff by demographic group T5-7 - % of faculty and staff reporting satisfaction in the work environment	responsibility T5-D - Effective evaluation processes that result in accountable faculty and staff with a clear understanding of their job expectations and how they contribute to the University's mission	performing their jobs T5-G - Successful recruitment and retention of a talented and high performing, diverse workforce	T5-J - Optimal number of faculty and staff comparable with our benchmark institutions
T6 - Facilities and Infrastructure Theme 6 Metrics: T6-1 - # and % of technology enabled classrooms T6-2 - Total expenditures for physical facilities and infrastructure projects T6-4 - Total funding available to support facilities and infrastructure needs T6-5 - % of faculty, staff, and students reporting satisfaction with facilities and infrastructure	T6-A - Responsive, timely, and strategic facilities services aligned with campus operational needs as well as future planning and implementation T6-C - Robust and reliable information technology ensuring business continuity and consistent with the achievement of the highest quality levels of support for research, instruction, student services, and administration	T6-D - Adequate office space for all K-State employees equipped to support their work and productivity T6-E - Enhanced campus community experience and collaborative learning and working environments promoted by facilities that support multidisciplinary work and integrated interaction between students, faculty, researchers, staff, and administrators T6-F - Efficient, reliable, and cost-effective central and building utilities with the capacity for expansion as needed to support campus needs and guarantee the safety, comfort, and integrity of our research, animal, and human environments	T6-H - High-quality research laboratories and specialty spaces that enhance research and scholarly activities T6-I - Well-maintained buildings, utilities, IT infrastructure, and grounds consistent with the expectations and image of a highly ranked land grant research and teaching institution
T7 - Athletics	T7-B - Enhanced learning environments and relationships promoted by facilities and integrated activities that support interaction between students, student-athletes, and the campus community T7-C - Enhanced integration between academics and athletics	T7-H - Increased funding for our total endowment	T7-I - National reputation for a world-class student-athlete experience T7-J - Recognized leader in integrating academics and athletics T7-K - World-class facilities at all levels

Links to University Thematic Goals, Outcomes, and Metrics			
Links to 2025 Thematic Goals and Metrics	Links to Short Term Outcomes (2011 – 2015)	Links to Intermediate Outcomes (2016 – 2020)	Links to Long Term Outcomes (2021 – 2025)
	T7-D - Increased support for academics through athletics		T7-L - Sustained funding for student-athlete scholarships