

**Department of Physics, North Dakota State University:  
Strategic Vision for 2016/17-2020/21**

**Student Success and Learning**

**Objective:** Increase graduate student enrollment

**Metric:** Increase number of PhD students from 11 in 2015/16 to 17 before 2020/21,

Strategy	Tasks	Metric	Responsibility
Increase number of GTA positions to 8 until 2020/21, increase GTA assistantship to 20k, support health insurance, seek to secure additional private donor support	Priority of using departmental funds to support GTAs, allocate salary savings toward the increase of appropriated GTA funds, establish relationships with potential donors	Number of GTA positions and dollar amount of assistantship	Department Chair
Increase visibility of Department to prospective graduate students	Establish permanent presence at GradSchoolShopper and improve webpage presence	Number of applications to graduate program	Graduate Committee
Increase attractiveness of Department for prospective graduate students	Improve web-presence, actively advertise open positions	Number of applications to graduate program	Webpage Committee
Develop recruitment channels for graduate students	Continue recruitment seminars at local physics departments (MSUM, UND); develop Annual Undergrad Research Conference into recruitment platform	Number of applications to graduate program	Graduate Committee, Outreach Committee

**Objective:** Increase success and graduation rates of graduate students

**Metric:** Achieve average graduation rate of 2 PhD students 2016/17-2018/19 and 3 PhD students 2019/20-2021/22

Strategy	Tasks	Metric	Responsibility
Provide professional development support for all graduate students	Allocation of Summer School revenue	80% of graduate students in 2 <sup>nd</sup> year and higher present (talk or poster) at conferences/meetings	Student advisors, Department Chair
Mentor and support activities of Graduate Student organization (Grad Phi)	Allocation of support from department budget, develop mentorship	budget allocations, number and quality of Grad Phi activities	Graduate Committee, Department Chair
Provide interested graduate students with summer teaching opportunities	Coordinate summer courses; identify and mentor instructors, recruit students	Annual revenue from Summer School	Curriculum Committee, Graduate Committee

**Objective:** Increase enrollment of undergraduate students in physics

**Metric:** Increase number of physics majors (including double majors that involve physics) to 60 before 2020/21

Strategy	Tasks	Metric	Responsibility
Increase job perspectives in industry for physics majors	Develop one or more double major programs (such as with ECE), annually invite seminar speaker from industry	Number of students enrolled as double majors in those programs	Ad hoc committee
Advertise our program at local High Schools	Invite interested student groups from local High Schools to visit the Physics Department	Frequency and number of students visiting	Ad hoc committee
Advertise Department strengths	Use meetings with prospective students and parents as program advertising platform	Enrollment of prospective students	Chair

**Objective:** Improve undergraduate graduation rates of physics majors

**Metric:** Until 2020/21 increase number of graduates to 7 or more per year, have 50% of our majors graduate after 4 years

Strategy	Tasks	Metric	Responsibility
Move to one-year course rotation for upper-level physics courses	Implement one-year course rotation starting Fall 2016	Start of one-year course rotation in Fall 2016	Curriculum Committee
Improve consistency of physics course content across entire curriculum	Produce detailed course content items for upper-level physics courses	Visibility of detailed course content items on department webpages until Fall 2016	Curriculum Committee and Webpage Committee
Provide support for undergraduate students to effectively use their new learning space in SE108	Work with Society of Physics Students to understand student needs and provide funds to equip SE108	Feedback from Society of Physics Students and from individual students	SPS faculty mentor
Increase student success in upper-level courses	Support student engagement by facilitating access to active-learning groups for all students	DFW-rate in upper-level courses	All faculty who teach upper-level courses

**Objective:** Establish a culture of incorporating undergraduate students early into research projects

**Metric:** 70% of all majors perform research with faculty before senior year, 30% graduate with authorship in publication

Strategy	Tasks	Metric	Responsibility
Provide and promote research opportunities for undergraduate students early	Collect projects from faculty and advertise using web pages, email, and SPS meetings	Number of undergraduate students involved in research projects	Outreach committee, SPS faculty mentor, Webpage Committee
Reward successful undergraduate research	Featuring successful projects on webpages; department ceremony for undergraduate research award; expand Annual Undergraduate Research Conference, have undergraduate students present research results at conferences/meetings/seminars	Number of publications with undergraduate students, number of research presentations (posters, talks, seminars) given by undergraduate students	Research-active faculty, Nominations Committee, Outreach committee

**Objective:** Improve undergraduate success in large-enrollment service courses (Phys110,120,211,212,251,252), reduce D,F,W-grades to  $(10+N/20)\%$ , where N is the number of students in section (with  $N>100$ ), until 2020/21

**Metric:** Measured learning gains in student assessment, impact of the gains on reduction of D,F,W-grades.

Strategy	Tasks	Metric	Responsibility
Engage students in large-enrollment service courses, promote student learning	Facilitate adoption of active-learning methods, support faculty access to LAs, use expertise provided through Gateways-ND, use new learning spaces in STEM building	Measured learning gains in student assessment, solicit student feedback about level of engagement	Course instructors, Curriculum Committee, Department Chair
Provide students with additional help tailored to the needs of physics service courses	Assign a GTA as support to form and mentor learning groups, initial task is one GTA for all courses with more than 200 students	Reduction of D,F,W-grades to less than $(10+N/20)\%$ , where N is the number of students in section	Graduate Committee, Department Chair
Transform instructional approach of teaching physics for students with life science background	create new course Physical Foundations of Biological Systems, develop this course as model for similar courses at NDSU	Start offering new course in Fall 2016 (depends on funding)	Project team as listed in NDSU Learning and Student Success Grant Program proposal

## Research and Scholarship

**Objective:** Increase departmental research impact

**Metric:** Rankings of department according to Academic Analytics; exceed 30 journal publications per year

Strategy	Tasks	Metric	Responsibility
Strengthen the network of research collaborations	Provide funds to invite external collaborators and high-profile researchers through department seminar	Number of joint publications, number of successful new collaborations	Research-active faculty, Seminar organizer
Increase publication rates, especially those in top-tier journals	Publish more than 30 journal papers annually (3 per faculty on average), 75% in top tier journals (Quartile 1 according to SJR)	Web of Science, Academic Analytics	Research-active faculty
Recognize crucial role of graduate students for research success; create department culture of graduate student excellence	Use part of revenues from Darrell Strobel endowment to establish new graduate student research award and award ceremony	First award in 2016/17	Nominations Committee
Recognize importance of publications in high-impact journals	Attempt to publish at least one article in journal with SCImago Journal Rank above 4	Existence of one or more submissions	Research-active faculty

**Objective:** Achieve funding levels that enhance research output and impact of department

**Metric:** Measure of success results from annual evaluation and is specific for each faculty member: appropriate funding level provides full support of research activities and research group (with focus on graduate students)

Strategy	Tasks	Metric	Responsibility
Continuous growth of research expenditures	Submit competitive proposals to funding agencies	Number and support level of funded proposals	Research-active faculty
Contribute to research in Grand Challenge areas	Work toward establishing interdisciplinary collaborations with NDSU researchers that connect to Grand Challenge areas	Number of joint proposals with NDSU faculty who work in Grand Challenge areas	Research-active faculty
Increase competitiveness of submitted proposals	Develop mentoring program for faculty with insufficient grant support through well-funded faculty	Proposal funding rate	Research-active faculty, Department Chair

**Objective:** Reward faculty for excellence in Research

**Metric:** Number of award nominations and funds for recognition of research excellence

Strategy	Tasks	Metric	Responsibility
Reward department for striving toward excellence in scholarship	Provide professional development support for faculty	Annual Professional Activity Report	Department Chair
Recognize research excellence	Nominate faculty for research awards, display news items on webpage featuring successful faculty research	Number and visibility of awards; continuous update of webpage news items	Nominations Committee, Webpage Committee

## Diversity, Engagement, and Outreach

**Objective:** Diversify undergraduate and graduate student body, and physics faculty

**Metric:** attract underrepresented minority (URM) and female graduate students, successfully graduate 75% of female and URM physics majors, 50% of new faculty hires until 2019/20 are URM or female

Strategy	Tasks	Metric	Responsibility
Diversify graduate student body	Membership in APS-Bridge as Partnership Institution provides access to national database of URM students who plan to pursue graduate studies in physics	Number of applications from URM students	Graduate Committee
Support success of female undergraduate physics majors	Offer full support to participate in APS Conferences for Undergraduate Women in Physics (CUWIP)	Number of students attending CUWIP	Department Chair
Integrate new faculty into national discussions about diversity in physics	Provide support for new faculty to participate in New Physics and Astronomy Faculty Workshop of APS	Fraction of new faculty attending	Department Chair
Increase recruitment and retention of female undergraduate students	Encourage the formation of a Women Undergraduate Physics student group	Group formed 2016/17	Department Chair

**Objective:** Create a culture of engagement for faculty and students

**Metric:** Number and success of outreach and student-engaging events

Strategy	Tasks	Metric	Responsibility
Participation in the University Physics Competition	Departmental support of the event; mentorship by faculty	Number of teams that participate every year	SPS faculty mentor, Department Chair
Provide educational outreach to K-12 students	SPS organizes Science Fun Night; students and faculty participate in Science Fair and Science Olympiad; graduate students participate in Avenues to Scientific Discovery event	Success of events as measured by feedback from students and parents	SPS faculty mentor, faculty
Maintain excellent relationships with local physics departments	Continue annual get-together with faculty from MSUM and Concordia College, meet with UND faculty at annual poster session	Feedback from faculty at local physics departments, number of collaborative projects	Outreach Committee, Department Chair

**Objective:** Maintain high level of service to the profession

**Metric:** At least 50% of faculty engage in leadership positions in professional organizations, as journal editors or in editorial boards, as reviewers for national agencies, textbook and monograph writing, etc. (metric applies every year)

Strategy	Tasks	Metric	Responsibility
Maintain high level of involvement at professional organizations, editorial work, proposal evaluation, paper reviewing, textbook writing	Recognize time commitment for faculty to perform service to profession	Faculty continue service to the profession and engage in leadership positions	All faculty, Department Chair