



**LUDDY SCHOOL OF
INFORMATICS, COMPUTING,
AND ENGINEERING**

INDIANA UNIVERSITY

Strategic Plan for Inclusive Excellence: Vision and Objectives

Indiana University
Luddy School of Informatics, Computing, and Engineering

August 2021

EXECUTIVE SUMMARY

Teams involved with technology that draw from a range of rich and diverse perspectives increase their performance capabilities when problem solving and innovating. The Luddy School of Informatics, Computing, and Engineering draws inspiration from everywhere for the next world-changing advances and life-saving solutions; our diverse perspectives provide a powerful edge for the next generation researchers, faculty, students and staff.

The vision of the Luddy School vision is of a community committed to diversity as a core strength and as a principle for maximum innovation, creativity, pedagogy, and scholarship. The Luddy School currently is falling short in its aspirations for recruitment and retention of students from underrepresented populations. For example, the distribution of undergraduate computing degrees awarded by Indiana University Bloomington across populations of students shows IUB trailing the state of Indiana and the nation in the percentage of degrees awarded to underrepresented populations. Also, although IUB performs slightly better than the state of Indiana in terms of degrees awarded to women, the total percentage (at 14.18%) falls far short of the proportion of the population that are women.

Additionally, undergraduate students from underrepresented populations are more likely than their peers to earn grades of D, F, or W (i.e., DFW) and earn overall lower grades in introductory courses¹. These discrepancies persist into upper-level courses suggesting that we aren't simply “weeding out” underprepared students. Further, female students are less likely to sustain enrollment through upper-level courses.

In May 2020, Luddy School Interim Dean Dennis Groth and Associate Dean for Research Kay Connelly convened a Diversity, Equity, and Inclusion (DEI) Task Force with the objective of defining a strategic plan for the Luddy School and addressing the National Science Foundation’s Computer Information Science and Engineering Directorate (NSF CISE) requirement that grant proposals include Broadening Participation in Computing (BPC) plans in response to select NSF CISE solicitations. Under the leadership of Michael A. and Laurie Burns McRobbie Bicentennial Professor of Computer Engineering Beth Plale and Assistant Dean for Diversity, Equity, and Inclusion, Lamara Warren, a task force was formed. The task force's first meeting was held in August 2020, and its final report was delivered in August 2021.

Our vision for attaining inclusive excellence is:

The Luddy School reaches inclusive excellence through an ongoing process of self-reflection, analysis, engagement, and feedback. The Luddy School gives high priority to inclusive excellence in its strategic directions and resource allocations. The Luddy School reaches inclusive excellence when all members of the Luddy community strive for deep recognition and affirmation of who we all are, where we come from, and what kind of school we want to be.

The vision will be realized through six high-level objectives and associated metrics. The plan gives Luddy School departments and units the freedom to tailor implementations of the objectives to fit their needs. Metrics accompanying each objective provide the framing within which measurable progress can be made.

¹ Student grade distributions Fall 2015 – Spr 2020 tracked by IU decision support system, dssBar. Includes enrollments in UG courses with all students – including non-degree and graduate students.

The high-level objectives of the plan for inclusive excellence are summarized as:

- 1) ***Excellence in the Learning Experience and Pedagogy*** - increasing retention of graduate and UG students from underrepresented populations; and increasing levels of pedagogical excellence of those who teach. This objective deals with improvements to student retention rates and the in-classroom experience as orchestrated by course instructors.
- 2) ***Welcoming to All: Luddy Community and Climate*** - strengthening the Luddy experience for students from underrepresented populations. This objective concentrates on the student experience outside the classroom, and on the faculty and staff experience as part of the Luddy School community.
- 3) ***Inclusive Recruitment Practices - Student***
- 4) ***Inclusive Recruitment and Retention Practices - Faculty***
- 5) ***Inclusive Recruitment and Retention Practices - Staff***
- 6) ***Facilitating Broadening Participation in Computing (BPC) in Research - BPC Harness*** - The BPC Harness, a new program proposed here, assists faculty in identifying BPC efforts that are synergistic with the inclusive excellence vision and in connecting them with evaluation/assessment resources.

The Luddy School Strategic Plan for Inclusive Excellence documents an overarching set of objectives and metrics. Realization of the plan requires unit-level plans for its implementation. The unit-level implementation plans must align with and support the metrics that are defined in this plan. Progress towards a more diverse and inclusive school additionally requires broad adoption of the Plan for Inclusive Excellence. Our aim is that the vast majority of the faculty, staff, and student body of the IU Luddy School will regularly participate in activities that broaden participation in computing and create a more inclusive climate.

The Luddy School should convene a school-level, faculty-led, standing Committee for Inclusive Excellence that, in close coordination with the Luddy School Office of Diversity and Inclusion (LODI), is responsible for the success of the Luddy School Strategic Plan for Inclusive Excellence. Among other responsibilities, the standing committee should manage staff to support the BPC Harness, with the aim of lowering the activation energy for faculty to find and join BPC activities, and to administer assessment and reporting.

The Luddy School should retain expertise in evaluation and assessment to ensure optimal outcomes under this plan.

Additional resource requirements include better management, tracking, and analysis of data required to continually assess improvement under this plan, and administrative staffing to carry out climate surveys and assist with administrative duties.

I. INTRODUCTION

The Luddy School of Informatics, Computing, and Engineering is limitless in drawing ideas and inspiration for the next world-changing advances and life-saving solutions. We are successful in this by fully and wholeheartedly embracing diversity across the staff, students, and faculty of the Luddy School. Teams with a range of rich and diverse perspectives to draw from increase their performance ability when problem solving and finding innovative solutions². Diversity represents an approach to viewing the world, a commitment to inclusion, and a deep recognition and affirmation of who we all are, where we come from, and what we are working toward.³

The Luddy School shares Indiana University's commitment to practice diversity as a commitment to inclusion where everyone is welcomed, valued, and provided opportunities to grow so they can do their best work. Practicing diversity is an ongoing process by each member of the community. Together, we can strive for the Luddy School to be an exemplar of places where learning, knowledge generation, and scholarly engagement by all can thrive.

In alignment with IU, the Luddy School expresses diversity as a deep recognition and affirmation of who we all are and where we come from. This recognition and affirmation of individuals disregards race, ethnicity, color, nationality, sex, sexual orientation, gender identity and expression, socioeconomic class, religion, disability, age, military status, political ideology, visa status, economic status, geographic location, and language / linguistic ability². The Luddy School affirms the individual irrespective of a difference (or differences) that they may have. We must, however, prioritize interventions based on historical evidence (through data) from our own school and, in some cases, by the federal government's designation of underrepresentation in computing: people who are women, African Americans, Hispanics, American Indians, Alaska Natives, Native Hawaiians, Pacific Islanders, and persons with disabilities. Throughout this report, we refer to an individual (student, faculty, staff member) from an underrepresented population as being from an underrepresented population or group.

The vision of the Luddy School is of a community committed to diversity as a core strength and as a principle for maximum innovation, creativity, pedagogy, and scholarship. To arrive at a maximally inclusive environment, we need to tend to where we may be falling short.

One of these areas where we are falling short is recruitment and retention of students from underrepresented populations. To demonstrate the issues, we focus on the undergraduate population of the Luddy school, though these numbers can be taken to be suggestive of other populations as well. In Figure 1, we show computing degrees awarded by the Luddy School broken out by student population for the years 2016-2019. The figure shows trends in growth or decline of populations as a percent of the whole. Nonresident alien men have grown in percent of undergraduate degrees awarded, for instance. Table 1 shows in both percentage and numbers (counts), the undergraduate degrees awarded in AY 2019, and compares IUB statistics to those of the nation and the State of Indiana. Black or African American men and women are underrepresented as are Hispanic men and women relative to both state and nation. Adding together all degrees awarded to women from populations listed in Table 1 totals 14.18%, far short of the percentage of women who make up society of 2019 compute degrees awarded to women. Overall, there is substantially untapped potential for contributing to the national economy from a diverse recruitment and retention strategy.

² Hong L, Page SE. Groups of diverse problem solvers can outperform groups of high-ability problem solvers. *Proc Natl Acad Sci U S A*. 2004 Nov 16;101(46):16385-9. doi: 10.1073/pnas.0403723101. Epub 2004 Nov 8.

³ <https://diversity.iu.edu/about/diversity-definition.html>

Additionally, undergraduate students from underrepresented populations are more likely than their peers to earn grades of D, F, or W (i.e., DFW) and earn overall lower grades in introductory courses⁴. These discrepancies persist into upper-level courses suggesting that we aren't simply “weeding out” underprepared students. Further, female students are less likely to sustain enrollment through upper-level courses.

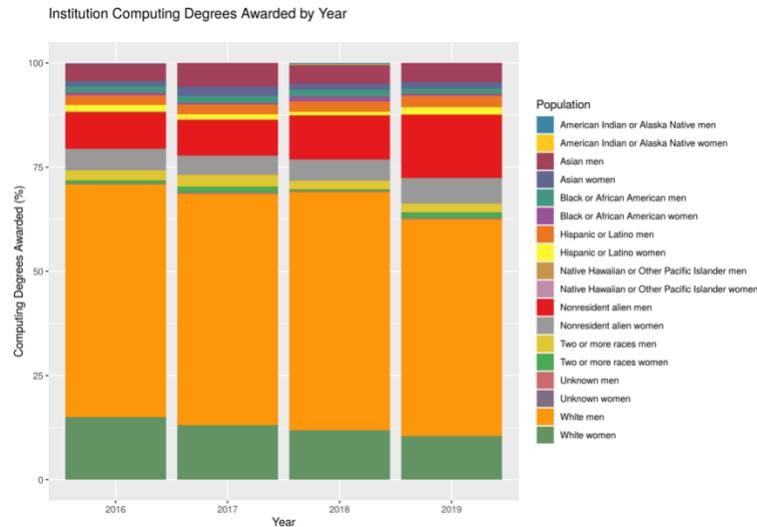


Figure 1. IUB UG degree distribution of computing degrees that are from the Luddy School, shown as a percentage. These percentages and numbers are shown for 2019 in Table 1 as well.

Year	Population	Compute Degrees awarded-National (%)	Compute Degrees awarded-National (N)	Compute Degrees awarded-IN (%)	Compute Degrees awarded-IN (N)	Compute Degrees awarded-IUB (%)	Compute Degrees awarded-IUB (N)
2019	Americ Indian/Alaska Nat men	0.16	113	0.09	2	0	0
2019	Americ Indian/Alaska Nat women	0.04	28	0	0	0	0
2019	Black or African Americ men	4.68	3029	2.36	55	1.29	8
2019	Black or African Americ women	1.54	995	0.98	23	0.48	3
2019	Hispanic or Latino men	8.41	5453	2.92	68	2.74	17
2019	Hispanic or Latino women	1.87	1207	1.59	37	1.77	11
2019	Native Hawaiian/Pacific Isl men	0.13	84	0.04	1	0	0
2019	Native Hawaiian/Pacific Isl women	0.04	26	0	0	0	0
2019	Two or more races men	2.87	1862	2.36	55	2.1	13
2019	Two or more races women	0.86	557	0.95	22	1.45	9
2019	White men	40.13	26001	50.21	1172	51.93	322
2019	White women	7.33	4753	9.26	216	10.48	65

Table 1. UG compute degrees awarded by population for nation, state of IN, and IUB. Totals do not equal 100% as Asian and Non-resident Alien populations are not included. Source of information: <https://bpcnet.org/statistics/>. Analyzed for IUB, five programs selected (9.0702 Digital Communication and Media/Multimedia removed).

⁴ Student grade distributions Fall 2015 – Spr 2020 tracked by IU decision support system, dssBar. Includes enrollments in UG courses with all students – including non-degree and graduate students.

II. TASK FORCE PROCESS

The Diversity, Equity, and Inclusion (DEI) Task Force began by compiling an inventory of current DEI-relevant programmatic activity and by surveying available data for analysis of recruitment and retention patterns. In the end, only undergraduate retention data from the IU OVPUE system was analyzed as other data was not in a form suitable for immediate analysis. Work is needed here. These sources were used to inform the DEI plan; the DEI plan contains the BPC requirement as one of the six objective areas.

In March 2021, the task force shared a draft version of this report with the Luddy School administration. Task force members shared and discussed the report in department-level faculty meetings with feedback captured in an internal spreadsheet. A Qualtrics survey was developed to seek views of faculty, staff, and students. The survey, open and available during March 2021, 41 responses. The task force held a workshop for faculty, staff, and students March 2021. The report was presented and feedback collected during moderated breakout groups. This version of the report, released in August 2021, reflects the Luddy School feedback from these meetings and discussions. The task force culminated its work with the release of this report.

The task force membership, made up of members of the Luddy community, ensured diverse perspectives as well as deep knowledge of prior school efforts in this space. The prior effort has substantially contributed to, and expedited the work of, this task force. The membership of the task force is as follows:

- Beth Plale (chair), plale@iu.edu, Michael A and Laurie Burns McRobbie Bicentennial Professor of Computer Engineering
- Lamara Warren (deputy chair), Assistant Dean of Diversity
- Monica Dignam, Office of Associate Dean of Research
- Devan Donaldson, Associate Professor, Department of Information and Library Science
- Gina Gallagher, Office of Development
- Fernando Maestre, graduate student, Department of Informatics
- Eatai Roth, Asst. Professor, Department of Intelligent Systems Engineering
- Selma Šabanović, Professor and Associate Dean of Graduate Studies, Department of Informatics
- Jeremy Siek, Professor, Department of Computer Science
- Una Thacker, Director ServeIT

Accompanying this report is a Luddy School-internal supplemental document of consensus recommendations for implementation by the DEI Task Force based on extensive study and discussion.

III. VISION

The vision of inclusive excellence for the Luddy School is of a diverse and talented community where all members thrive. This is achieved through a process of continuous improvement and refinement. It requires awareness and commitment by faculty and staff, committed resources, and clear objectives and measures.

This plan will help the Luddy School and its stakeholders integrate diversity, equity, and inclusion across its strategic decision-making, enhance organizational effectiveness, and fulfill the School's commitment to knowledge, scholarship, and educational excellence.

Attaining Inclusive Excellence

The Luddy School reaches inclusive excellence through an ongoing process of self-reflection, analysis, engagement, and feedback. The Luddy School gives high priority to inclusive excellence in its strategic directions and resource allocations. The Luddy School reaches inclusive excellence when all members of Luddy community strive for deep recognition and affirmation of who we all are, where we come from, and what kind of school we want to be.

IV. PLAN FOR EXCELLENCE: OBJECTIVES AND METRICS

The vision for inclusive excellence for the Luddy School is realized through six high-level objectives and associated metrics. The plan gives Luddy School departments and units the freedom to tailor implementations of the objectives to fit their needs. Metrics accompanying each objective provide the necessary framing within which measurable progress can be made.

The high-level objectives of the plan for inclusive excellence are summarized as:

- 1) ***Excellence in the Learning Experience and Pedagogy*** - increasing retention of graduate and UG students from underrepresented populations; and increasing levels of pedagogical excellence of those who teach
- 2) ***Welcoming to All: Luddy Community and Climate*** - strengthening the Luddy experience for students from underrepresented populations A retention objective for students, faculty, and staff.
- 3) ***Inclusive Recruitment Practices - Student***
- 4) ***Inclusive Recruitment and Retention Practices - Faculty***
- 5) ***Inclusive Recruitment and Retention Practices - Staff***
- 6) ***Facilitating Broadening Participation in Computing (BPC) in Research - BPC Harness***

1. Excellence in the Learning Experience and Pedagogy

Objective (1): The Luddy School embodies excellence in the classroom and in pedagogy such that all will benefit who come to the Luddy School to learn, study, and perform.

This objective deals with improvements to student retention rates and of the in-classroom experience as orchestrated by course instructors. Excellence in the learning experience recognizes that students come from different backgrounds and have different learning styles and strengths. The experience in the classroom is a positive one that acknowledges these differences. Taking into account the breadth of experience, skills, and learning styles of students benefits all students, including those from underrepresented populations. Pedagogical excellence applies to those in the role of instructor, including associate instructors (AI). The learning experience objective is measured by improvements in the rate of retention of students from underrepresented populations; the pedagogy objective is measured by instructor evidence of advances towards pedagogical excellence.

Metrics

- Excellence in learning experience:
 - Course attrition rates (measured by course DFWs) for students from underrepresented populations achieves parity with that of students not from underrepresented populations
 - Program attrition rates (measured by program departures) for students from underrepresented populations achieves parity with that of students not from underrepresented populations
 - An annual increase in enrollment of undergraduate students from underrepresented populations in non-mandatory course options (e.g., thesis options, capstone, or senior design)
- Pedagogical excellence:
 - By 2022, resources and incentives are aligned by which those who instruct can contribute to pedagogical excellence
 - By 2022, accepted measures for pedagogical excellence are in place
 - By 2023, pedagogical excellence continuously improves

2. Welcoming to All: Luddy School Community and Climate

Objective (2): The Luddy School is a “welcoming to all” community and climate. It is an exemplar of a place where learning, knowledge, and scholarly engagement can thrive for all and where all voices are heard. Faculty, staff, and students from underrepresented populations accumulate experiences over time that contribute in significant and often subtle ways to their ability to succeed in whatever endeavor brings them to the Luddy School. It is the goal of inclusive excellence for the Luddy School to be a welcoming and supportive climate for all. The school must be proactive in identifying and addressing structural issues of bias (such as racism) where it exists.

This objective concentrates on the student experience outside the classroom and on the faculty and staff experience as part of the Luddy School community.

The Luddy School should carry out an annual climate survey for faculty, staff, and students, and distribute the Data Buddies Survey⁵ to students annually.

Metrics:

- Climate:
 - Annual climate survey and Data Buddies Survey shows increasing improvements in climate for students, postdocs, faculty, and staff from underrepresented populations.
 - Affinity group members and chapter leaders will report a favorable opinion of faculty participation and department and/or school contributions.
- Faculty activity:
 - Increasing levels of high-quality faculty DEI activity.
- Student opportunities:
 - Increased use of, and student engagement in, *High Impact Practices*⁶

3. Inclusive Recruitment Practices - Students

Objective (3): The Luddy School uses inclusive practices to recruit the most talented and promising students to our field. Recruitment practices are adapted that take a broad definition of talent and promise. They reflect, in terms of the expenditure of time and resources, the unique challenges of successfully recruiting students from underrepresented populations.

Metrics:

- 5-10% annual increase in number of students recruited who are from underrepresented populations
- 5-10% annual increase in number of students accepting offers of admission who are from underrepresented populations

4. Inclusive Recruitment and Retention Practices - Faculty

Objective (4): There is unrealized potential in a recruitment and retention strategy that accommodates and prioritizes diversity of its faculty. The Luddy School will strive for representation of its faculty and staff that mirrors state, or better still, national demographics.

⁵ <https://cra.org/ceip/data-buddies/>

⁶ <https://nsse.indiana.edu/nsse/survey-instruments/high-impact-practices.html>

It accomplishes this objective through promotion criteria that are clear, transparent, and fairly applied. Exit information is used, in a transparent manner, to strengthen the school's performance under its Plan for Inclusive Excellence. Structures are in place to educate faculty on, and identify and reward as appropriate, the implicit loads born by a faculty member from an underrepresented population (i.e., Black and Brown faculty shouldering the emotional and intellectual burden of being liaisons for the school's Black and Brown students). Recruitment time and resource budgets are positioned to reflect the unique challenges of identifying and attracting the best talent from underrepresented populations.

Metrics:

- By 2023, all Luddy School departments request diversity statements of applicants
- Candidate evaluation processes actively recruit from underrepresented populations
- By 2023, candidate lists reflect the demographics of the academic community represented by the department with respect to underrepresented populations
- By 2023, faculty recruitment time and resource budgets reflect the unique challenges of identifying and attracting the best talent from underrepresented groups
- Measured improvement of retention of faculty from underrepresented populations based on information collected from climate surveys and exit information
- Measured improvement in recognition of the implicit loads born by faculty of an underrepresented group.

5. Inclusive Recruitment and Retention Practices - Staff

Objective (4): The Luddy School is an organization where all qualified applicants have an equal chance to be hired and promoted. The Luddy school will strive for a staff population that reflects the demographics of the State. Recruiting pools will be broad, and candidate evaluation processes are reviewed for bias. Exit information is used, in a transparent manner, to strengthen the school's performance under its inclusive excellence plan.

Metrics:

- The Luddy School will increase the number of people from underrepresented populations in key staff positions
- Consideration will be given to blind hiring processes

Measured improvement of retention of staff from underrepresented populations based on information collected from climate surveys and exit information

6. Improving Research Competitiveness: Facilitating Broadening Participation in Computing (BPC) in Research - BPC Harness

Objective (5): Grant applications to the CISE directorate of the National Science Foundation increasingly include a required plan for Broadening Participation in Computing (BPC). It benefits both the Luddy School and the grant applicant to work synergistically to define a BPC plan is measurable, and that leverages existing Luddy School programmatic activity. The BPC Harness, a new program proposed here, assists faculty in identifying BPC efforts that are synergistic with the inclusive excellence vision, and connect them with evaluation/assessment resources.

The Luddy School should retain or hire assessment expertise to assist in evaluating NSF CISE award BPC activity. Staff time should be written into external grant budgets. This capacity is in addition to the assessment carried out to evaluate the activities that implement the objectives of this plan. The Luddy

School should establish school-level partnerships (MOUs) with community organizations (e.g., Wonderlab) to create capacity for faculty NSF BPC plans (to host outreach events).

Examples of activities that faculty grant applicants could engage in include:

- Identify changes they have made in their teaching to improve student outcomes and/or expand the use of effective pedagogical strategies that have been shown to have a positive impact for students underrepresented in computing.
- Attend an inclusive pedagogy or transparent teaching training session offered by the teaching and learning center, and demonstrate success with it in your classroom.
- Host an REU student from the DREU program or AccessComputing REU program.
- Orchestrate trips for graduate and undergraduate students of underrepresented populations to present their work at a diversity-focused conference, which may include a regional WiC conference, the Richard Tapia Celebration of Diversity in Computing conference, and Grace Hopper Celebration of Women in Computing.
- Visit the same area minority-serving institution each semester of your award to make connections with faculty and students to encourage students to pursue opportunities within the department (e.g., REUs, graduate programs, speaker series).
- Work with your department to host and feed various student affinity groups in a call event where students call accepted students in their demographic group, answer their questions, and encourage these promising young people to matriculate to the department.
- Establish a process and budget for ongoing undergraduate students visiting area high schools with high underrepresented populations and encourage them to attend college in computing.
- Contact all high school or community college transfer students who have been offered admission to the CS and ISE majors and are from underrepresented groups.

Metrics:

- Increasing levels of faculty engagement in high quality BPC activities also contribute to the objectives of this plan

V. IMPLEMENTATION

The Luddy School Plan for Inclusive Excellence documents an overarching set of objectives and metrics. Realization of the Plan for Excellence requires unit-level plans for its actual implementation. The unit-level implementation plans must align with and support the metrics that are defined in this plan. Progress toward a more diverse and inclusive school additionally requires broad adoption of the Plan for Inclusive Excellence. Our aim is that the vast majority of the faculty, staff, and student body of the IU Luddy School will regularly participate in activities that broaden participation in computing and create a more inclusive climate.

The Luddy School should convene a school-level, faculty-led, standing Committee for Inclusive Excellence that, in close coordination with the Luddy School Office of Diversity and Inclusion (LODI), is responsible for the success of the Luddy School Plan for Inclusive Excellence. The committee will:

- Manage and track success against the Plan for Excellence and BPC plan (on BPCnet Resource Portal)
- Undertake the Luddy School diversity faculty summit
- Oversee meeting of metrics both in Luddy School DEI plan and in its BPC plan
- Point of contact for students raising any kind of matters of concern
- Serve as a clearinghouse for activities within the BPC Harness
- Manage staff to support the BPC Harness, towards lowering the activation energy for faculty to find and join BPC activities and to administer assessment and reporting

The Luddy School should retain evaluation/assessment expertise.

Additional resource needs include better management, tracking, and analysis of data required to continually assess improvement under this plan, and administrative staffing to carry out climate surveys and assist with administrative duties.