

The Division of Biological and Environmental Science and Engineering (BESE)

Guided by Discovery – Identified by Impact



**Draft Strategic Plan
2025-2030**



A message from Professor Iain Young, Dean of BESE

In alignment with KAUST's mission to be a beacon of knowledge and innovation, I am delighted to present to you the Division of Biological and Environmental Science & Engineering's Strategic Plan for 2025-2030.

Our journey forward is both a reflection of our steadfast commitment to excellence and an adaptive response to the refocus within KAUST and the broader scientific landscape. KAUST's compact size enables us to be dynamic and responsive to these changes, enabling us to remain at the forefront of scientific innovation. Our commitment remains to curiosity-driven research linked to developing applications that will solve the major challenges facing our planet. We will achieve this by producing the highest quality students and research outputs, with collaborators within and outside KAUST.

This Strategic Plan is a testament to our alignment with KAUST's new strategy and the Kingdom's Vision 2030 RDI priorities, emphasizing our commitment to scientific excellence and impactful research, global and local collaboration, and commercialization for economic impact.

As we step into this promising new chapter, I extend an invitation to you to be part of our journey to forge a future where science and engineering catalyze significant and positive transformations in the world.



Strategic Framework and Priorities

Mission

BESE is dedicated to advancing the understanding and managing the health of marine, terrestrial, and human biology to develop food, water and soil security within healthy communities.

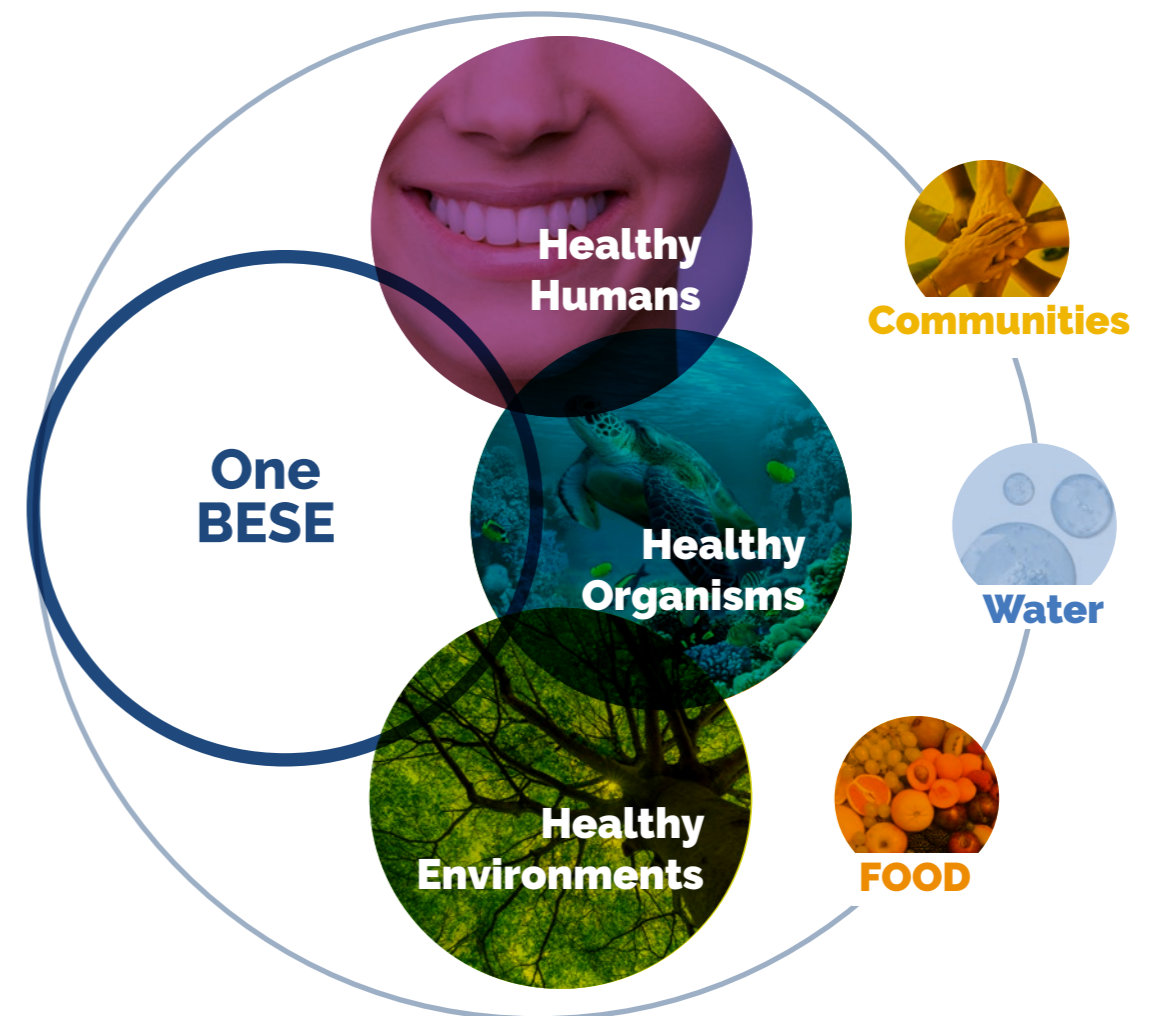
Grounded in fundamental research, our "Guided by Discovery – Identified by Impact" approach is rooted in academic excellence and emphasizes collaboration, communication, and impactful outcomes, linking with KAUST's Accelerating Impact vision.

Vision

With a focus on impactful, cross-disciplinary innovations and a commitment to sustainability, we strive to address the world's most pressing environmental challenges, nurturing future leaders and fostering a culture of excellence and diversity.

Research Disciplines

We will advance our global reputation for research excellence, leveraging our strong industry relationships to enhance our impact.



We focus on a One Health concept, with a highly multidisciplinary approach, seeking new discoveries, innovations, and products to make the greatest positive impact on the health and productivity of the planet.



Operational Goals for Research & Education

Core Objectives

- Enhance our global standing as a premier, research-intensive division in life and environmental sciences
- Strengthen our position as a preferred partner for industry collaboration, as well as Saudi flagship and government initiatives
- Foster entrepreneurial pathways and the creation of spin-outs from students and faculty
- Offer an enriching, multidisciplinary educational journey that empowers every student to thrive in their chosen path

Research and Academic Excellence

- Secure a top 100 ranking across all research disciplines, with at least 70% of our activities in the top 10 relevant discipline journals
- Lead in discovery-driven, solution-focused research to tackle global challenges while also achieving a notable enhancement in the quality of peer-reviewed publications as per academic benchmarks
- Support basic research activity that underpins applied science
- Encourage cross-disciplinary research by leveraging our faculty's expertise and partnerships with industry and government
- Develop and implement education and research performance targets for all faculty to quantify and improve performance
- Enhance the student experience with exceptional teaching using the latest methodologies and resources

Engagement and Partnership

- We aim to enhance engagement with public and government institutions in Saudi
- Develop strategic collaborations and working groups with institutions to increase the volume and value of externally funded research
- Establish priority research topics and ensure the provision of infrastructure pertinent to these areas of focus

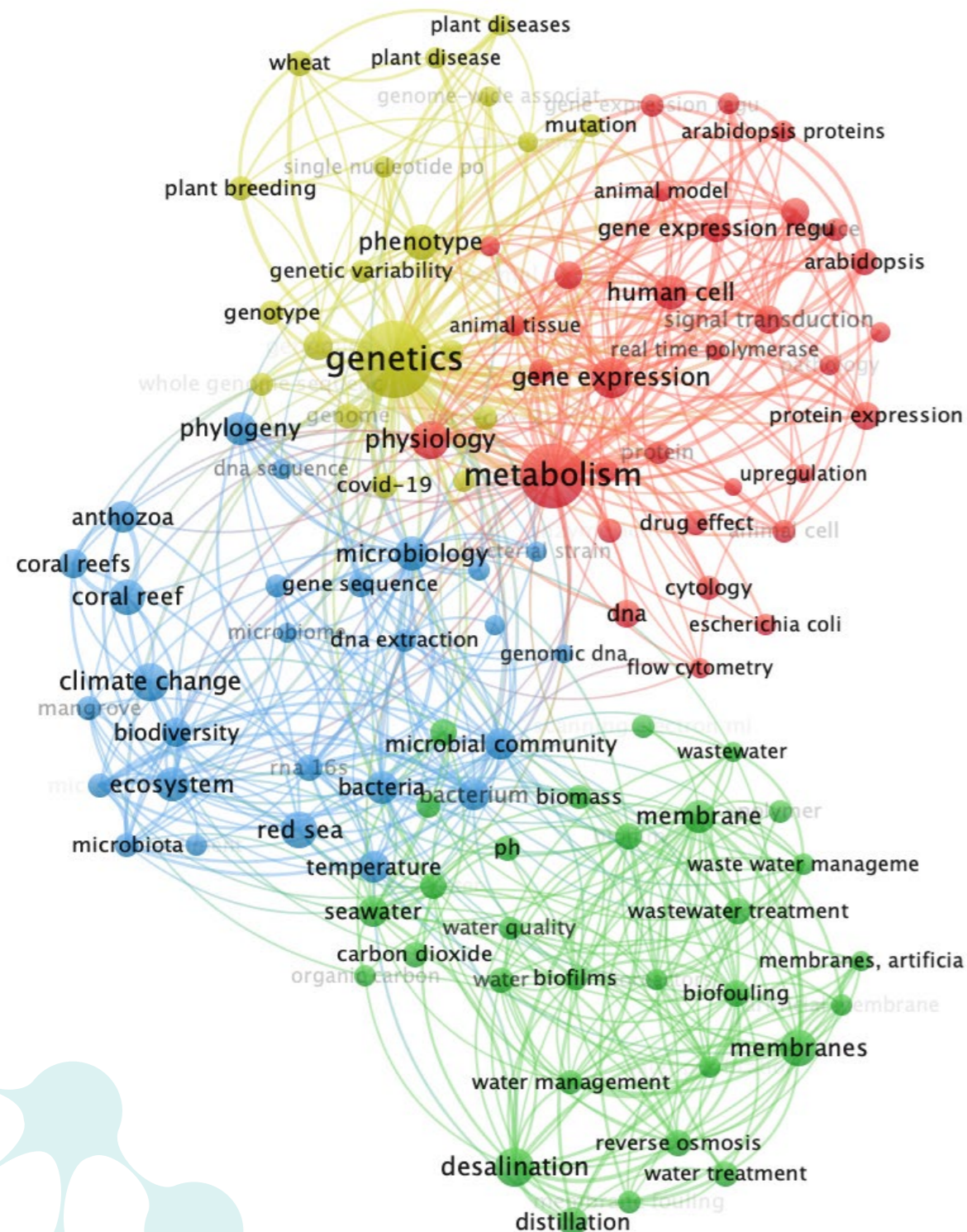
Culture

- Foster a culture of transparency, constructive disagreement, respect, and achievement.
- Prioritize the hiring of Assistant Professors, aiming for sustainable growth in the representation of Saudi and female faculty members
- Aim to achieve 50% representation of Saudi students
- Enhance faculty support by recruiting top-tier Divisional support staff



Who We Are

BESE boasts a diverse faculty and student body, committed to excellence in research and education. Our strategy leverages our impressive global standing and research output.



BESE in Numbers Faculty

63
Faculty

22%
Female

11	Assistant Professors
13	Associate Professors
39	Professors

Aim: Recruit top-tier assistant professors while improving gender balance

BESE in Numbers Research Scientists, Postdocs, and Alumni

155
Research Scientists

41%
Female

5%
Saudi

131
Postdocs

35%
Female

6%
Saudi

734
Alumni

56%
Female

33%
Saudi

43%
in Kingdom

BESE in Numbers Students

491
Students

62%
Female

34%
Saudi

76%
PhD

24%
Masters

Students by program

177
Bioscience

115
Bioengineering

75
Environmental
Science

68
Marine
Science

41
Plant Science

15
Bioengineering
Postgraduate Diploma

BESE Highly Cited Researchers in the last 10 years (2014-2023)

Though small in size, we boast a large proportion of Highly Cited Researchers, highlighting our commitment to excellence.



Carlos M. Duarte
Environment & Ecology
Plant & Animal Science



Mark Tester
Plant & Animal Science
Cross-Field



Salim Al-Babili
Plant & Animal Science



Heribert Hirt
Plant & Animal Science



Pierre Magistretti
Cross-Field



Jesse Poland
Cross-Field



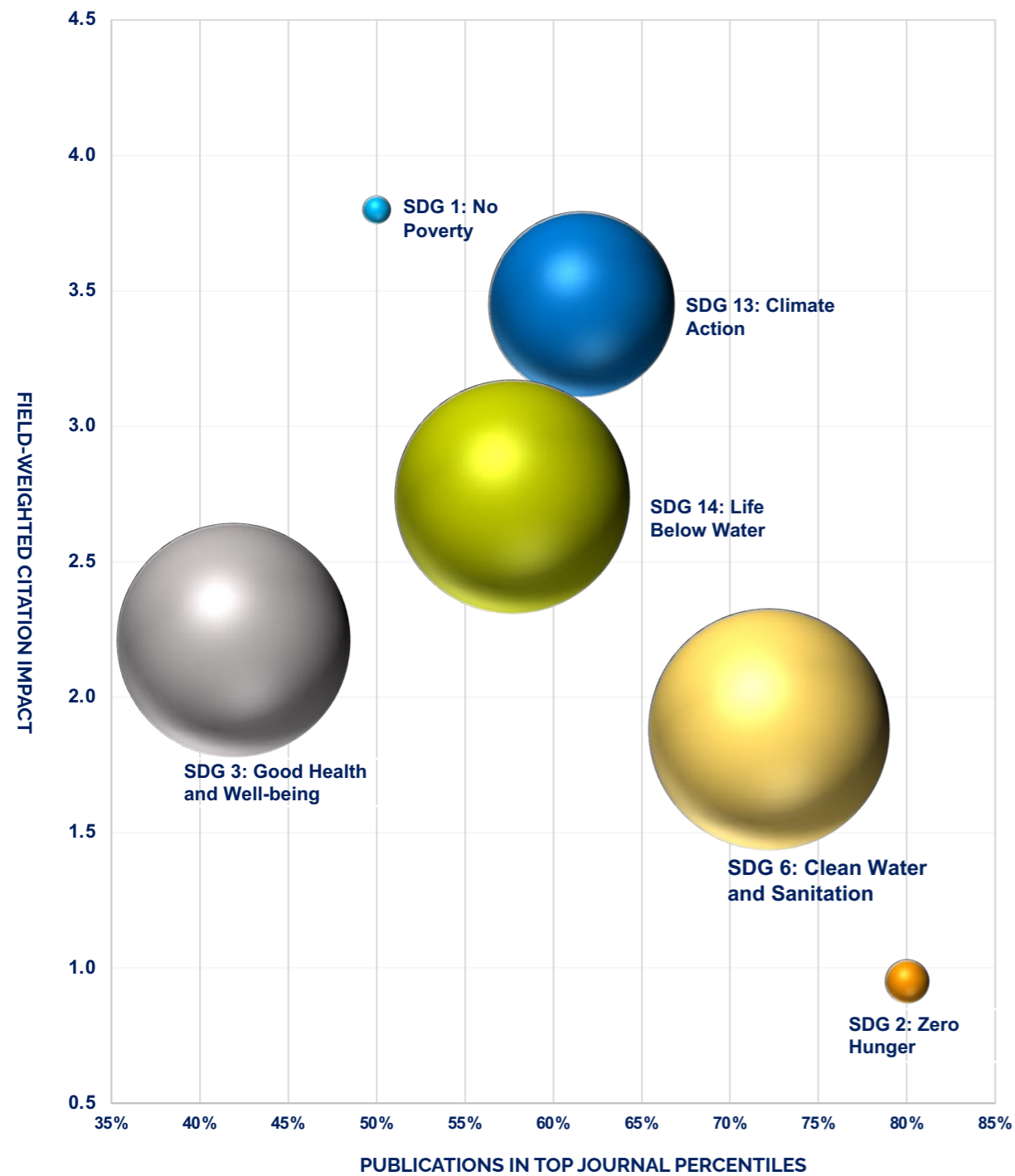
Yoshihide Wada
Environment & Ecology
Geosciences



Matthew McCabe
Geosciences Cross-Field

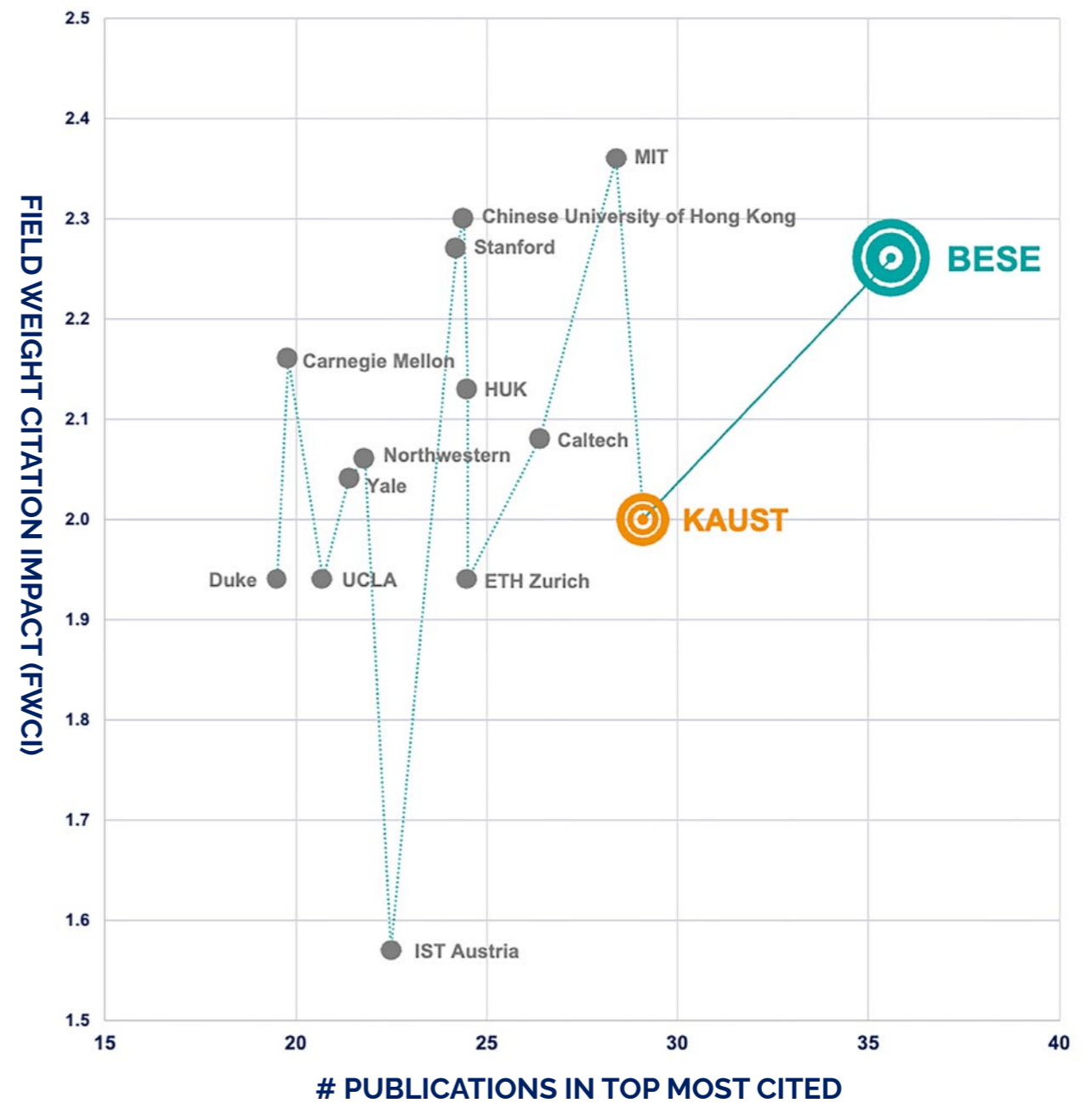
BESE Contribution to SDGs (2018-2022)

BESE Faculty continue to produce the highest quality research in areas of direct relevance to the SDG challenges.



Bubble sizes are proportional to the number of publications in this field

KAUST & BESE Benchmark Against International Universities



Aim: Retain and invest in excellence

BESE Solutions for Global Challenges



Read more stories of BESE impact

BESE research is addressing urgent global challenges through high-quality interdisciplinary research.



Kyle Lauersen
Algae Bio-Products

Problem: Resource efficiency requires developing ways of converting conventional waste into valuable products, including food, materials, and chemicals.

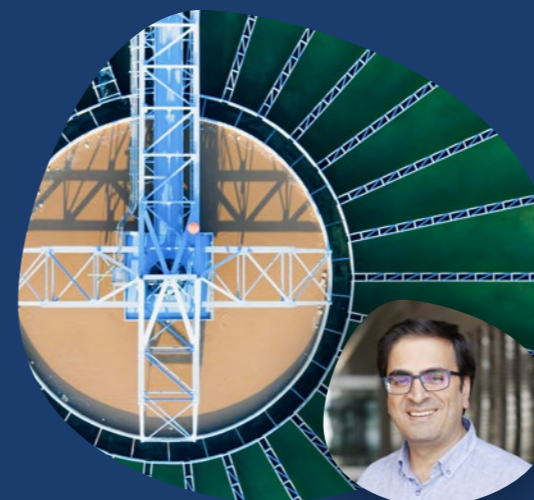
Solution: Professor Lauersen uses algae to convert wastes into higher chemicals. He has developed an extensive collection of local Saudi algae strains and leverages synthetic biology to engineer algae to make new products such as fragrances and platform chemicals.



Raquel Peixoto
Coral Restoration

Problem: Coral reefs are severely threatened by environmental stressors, lacking resilience to survive and thrive.

Solution: Professor Peixoto uses beneficial microorganisms to enhance coral resilience, providing practical solutions for the restoration and protection of marine ecosystems.



Pascal Saikaly
Wastewater

Problem: Communities without access to centralized sewage systems face significant challenges related to wastewater management.

Solution: Professor Saikaly and team collaborated with the Saudi government to develop and scale up an energy-efficient decentralized wastewater treatment and reuse technology with the aim of enhancing access to sanitation and clean water, and reducing infrastructure costs for underserved communities.



Mark Tester
Engineered Agriculture

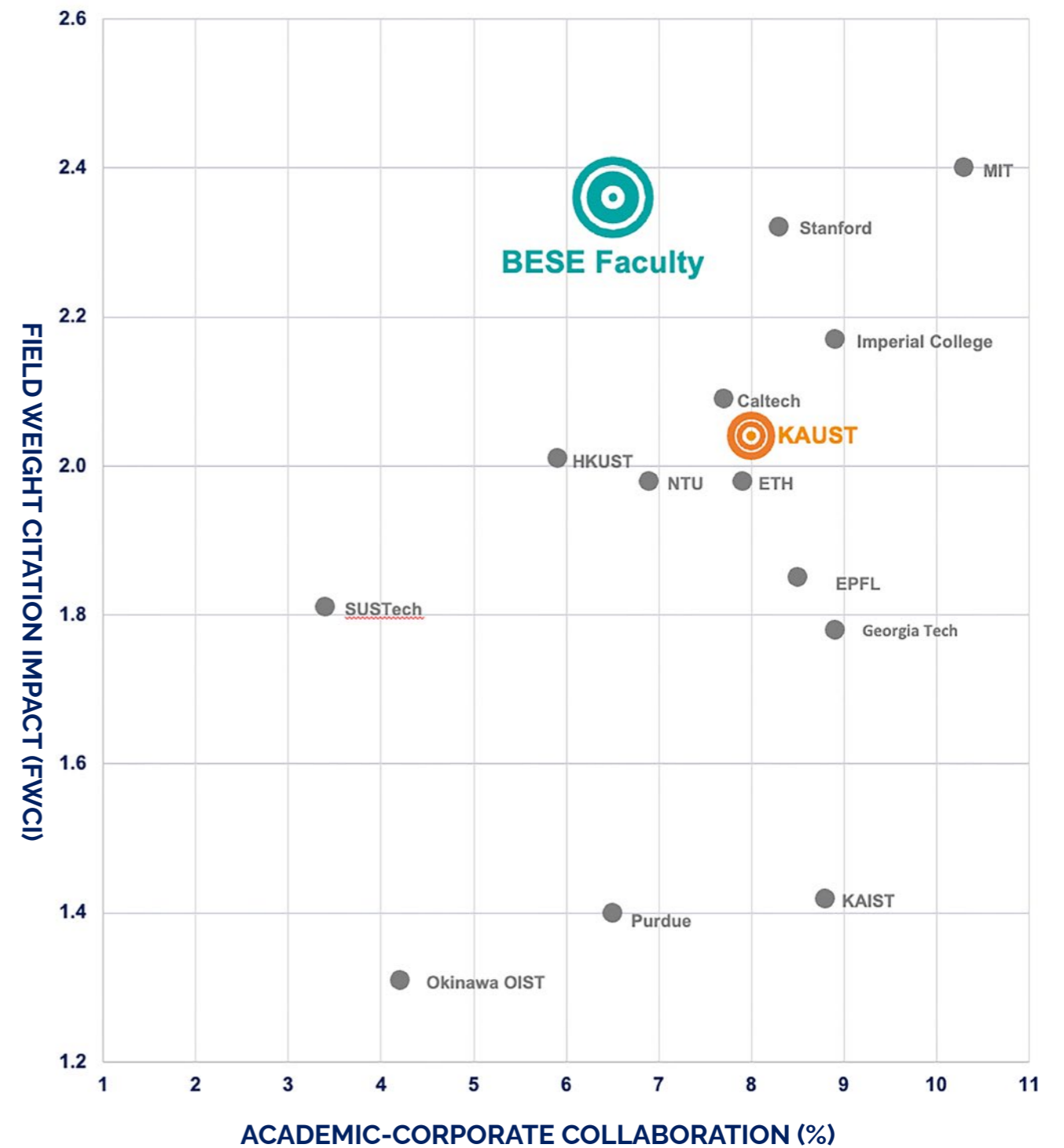
Problem: Unsustainable agricultural practices threaten global food security.

Solution: Professor Tester co-founded RedSea, an ag-tech company that transforms scientific discoveries into practical solutions, increasing agricultural efficiency and sustainability in harsh environments.

Benchmarking KAUST versus Global Universities (2018-2022)

BESE research is balanced across high quality fundamental research and applied research, and compares well against our competitors.

Aim: Increase our corporate and academic collaborations world-wide



Student and Alumni Success Stories

Our students are key to our success. Explore some of the recent achievements of BESE graduate students and alumni.



Lila Aldakheel
Arab Women in Science Award

Bioscience, M.S. '19, Ph.D. Student

Lila Aldakheel was awarded a L'Oréal-UNESCO For Women in Science Middle East Regional Young Talents student award. She is studying the effects of microplastics in mangrove forests, exploring ways to degrade them, and examining the microbial communities within the microplastics to identify properties that may enhance microplastic degradation. Aldakheel also received a BCG V60 Award.



Faisal Alkhalidi
AI Hackathon Winner

Bioscience, MS '20, PhD student

Faisal Alkhalidi won first place at the AI Oasis Hackathon during the LEAP24 tech event in Riyadh. Alkhalidi is pursuing a PhD in genome biology and bioinformatics, focusing on integrating his medical background with molecular and computational biology.



Nathalia Delgadillo
Climate Leadership Award

Marine Science, M.S. '20, Ph.D. '24

Nathalia Delgadillo received a BCG V60 Award, celebrating visionary women leading climate and sustainability efforts in the Middle East. At KAUST, she is studying microbial communities, deep-sea ecology, biotechnology, and bioremediation to explore how microorganisms can be used to mitigate environmental challenges in marine settings.



Hamed Albalawi
Innovator under 35 Award

Bioengineering, MS '20, Ph.D. Student

Hamed Albalawi was recognized as one of the MIT Technology Review Innovators Under 35 MENA awardees. At KAUST, his research focuses on developing an ecofriendly material and fabrication process for coral restoration and bone tissue engineering, underscoring his commitment to sustainable health and environmental solutions.



Luisa Javier Fregoso
Environmental Science and Engineering, MS '11, PhD '21
Founder & CEO of Wayakit



Sandra Medina
Environmental Science and Engineering, PhD '20
Founder & COO of Wayakit

Luisa Javier and Sandra Medina, founders of KAUST spinout WAYAKIT, co-created sustainable cleaning and maintenance solutions for the aviation, transportation, healthcare and facilities management sectors. WAYAKIT showcases their commitment to innovation and sustainability, reflecting their strong connection to KAUST and their significant impact on Saudi Arabia's biotech industry.



Summary

BESE is distinctive in blending scientific expertise with entrepreneurial acumen, leveraging our comprehensive resources — from on-campus facilities to virtual platforms and fieldwork opportunities. As a hub of interdisciplinary collaboration, we play a pivotal role in advancing the university's strategic goals, marked by our impactful partnerships with industry and international partners.

Aligned with KAUST's new strategy, BESE faculty are collaborating with stakeholders in Saudi Arabia to develop and implement solutions in food, water, health, and the environment. This effort supports the missions of the newly established Smart Health and Sustainable Food Security Centers of Excellence. Additionally, BESE is also advancing the research and technological expertise of the newly formed Research Technical Platforms for Computational Bioscience, Desert Agriculture, Red Sea Research, Water Desalination & Reuse and Smart Health.



