



UNIVERSITY  
OF HULL

**THYME** Project

Teesside, Hull and York - Mobilising Bioeconomy Knowledge Exchange

**STRENGTHENING  
THE BIOECONOMY  
BY MAXIMISING  
GRADUATE  
EMPLOYABILITY**



**An Action Plan for Industry  
and Higher Education**

Summary Report

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## FOREWORDS

The THYME Project region comprises Teesside, the Humber and North Yorkshire. The growing (no pun intended) regional bioeconomy provides opportunities for various interesting and fulfilling careers for our graduates, who are entering a highly competitive employment landscape. Understanding the opportunities available to them and being able to present their skills and knowledge to potential employers is crucial for graduates to secure highly-skilled employment. This report identifies key approaches to the design and delivery of degree programmes that prepare students to make future contributions to the bioeconomy. Collaboration between universities and local employers is key to the recommendations in this report, and the action plans presented make practical suggestions of how to align pedagogy and employability. Bringing regional employers into the curriculum introduces students to a wide diversity of careers, helps them develop appropriate skills needed for successful employment, and develop their employability skills in an inclusive and sustainable way. This co-creation of curricula between universities and employers has huge potential, and the best-practice approaches identified here will prepare graduates for successful careers in a growing area of the economy.

The bioeconomy has a key role in the UK's goal to achieve net-zero carbon emissions and is a central component within the Ten-Point Plan for a Green Industrial Revolution. The Teesside, Humber and North Yorkshire Region is home to significant breadth and depth in bioeconomy activities and businesses and continued growth of the sector in our region will require a highly skilled graduate workforce. This report presents wide-reaching research involving bioeconomy businesses who highlighted the significant commercial benefits of collaborating and exchanging knowledge with universities and engaging with students on relevant degree programmes. The report outlines opportunities for businesses to connect capability across the region, and how engagement with universities can benefit the business environment both immediately and into the longer term. By working with universities, businesses can maximise their innovation capacity and drive relationships with graduates in a sustainable and inclusive way. Increased university-business interaction and collaborations will also raise awareness of the sector with future graduates and highlight the potential of bioeconomy careers, helping prepare and retain a competent and well-equipped graduate workforce in our region.

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# EXECUTIVE SUMMARY

The bioeconomy is key to the UK's transition to a resilient, low-carbon future. The continued growth of the sector will require a highly skilled and knowledgeable graduate workforce. The Teesside, Humber and North Yorkshire region is home to significant bioeconomy-allied innovation capabilities, assets and industries. Despite this, many graduates leave their university city after completing their studies, thereby reducing the pool of available graduate talent for employers to draw from.

This report aims to bridge the gap between regional universities and businesses by identifying opportunities for employers and universities to maximise graduate employability for bioeconomy roles. Researchers from the University of Hull interviewed small, medium and large regional employers, university teaching staff and careers advisors from the three THYME Project partner institutions and relevant workforce skills experts.

This research found that:

- Collaboration between employers and universities can provide mutually beneficial opportunities to enhance graduate employability.
- Graduates have some areas for growth in transferable and professional skills.
- Bioeconomy employers are satisfied with graduates' knowledge and technical skills.
- Universities employ several effective approaches to developing graduate employability, but more widespread adoption and additional support could maximise their effectiveness.

This report presents action plans for employers and universities to collaboratively enhance graduate employability for bioeconomy roles, thereby benefiting both universities and employers.

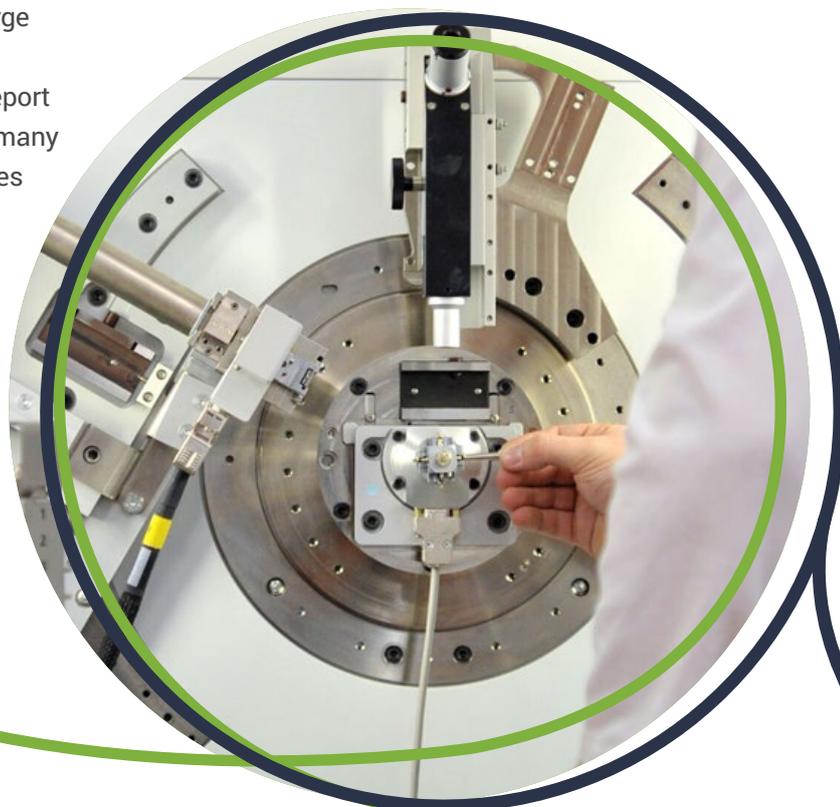


## THE CHALLENGE

The bioeconomy comprises businesses that use bioscience or biological knowledge to reduce non-renewable resource use and is a sector that provides an important contribution to the UK's transition to a resilient, low-carbon future. The bioeconomy is a key provider of green jobs, employing more than 5 million people in the UK within a sector that has a value of £220 billion GVA<sup>1</sup>. In the north of England, the bioeconomy supports over 400,000 jobs<sup>2</sup> and the Teesside, Humber and North Yorkshire region, which is the focus of this report, is home to significant bioeconomy-allied innovation capabilities, assets and industries.

Growing the regional bioeconomy further will require a highly skilled and knowledgeable graduate workforce. Over 16,000 students graduate from the Universities of Teesside, Hull and York each year<sup>3</sup>, providing a large pool of graduate talent for regional businesses<sup>4</sup> to potentially attract and retain. However, employers report that graduates can lack some important skills<sup>5</sup> and many cities, including Hull and York, do not retain graduates who moved there to study<sup>6</sup> in great number.

This report aims to bridge the gap between universities and employers by identifying opportunities for collaboration that would benefit both graduates and businesses, and support the retention of highly skilled graduate talent in our region. Providing a diversity of opportunities, underpinned by the recommendations in this report, will create an inclusive curriculum, which will maximise the likelihood of all students being able to participate in at least one employability-enhancing experience. Adopting the recommendations in this report will ensure that degree programmes prepare highly skilled, employable graduates for the growing bioeconomy.



<sup>1</sup>DBEIS. (2018) Growing the Bioeconomy. Department for Business Energy and Industrial Strategy.

<sup>2</sup>Eaves J, McQuilkin A, Mortimer M, Smith R. (2017) The Bioeconomy in the North of England. University of York.

<sup>3</sup>HESA. (2020) Graduate activities and characteristics: Higher Education Statistics Agency; [Available from: <https://www.hesa.ac.uk/data-and-analysis/graduates/activities>].

<sup>4</sup>York St. John University also contributes to the bioeconomy workforce in the Teesside, Humber and North Yorkshire region. York, Hull and Teesside are the focus here as they are THYME Project partners.

<sup>5</sup>Wakeham W. (2016) Wakeham Review of STEM Degree Provision and Graduate Employability. Department for Business Innovation and Skills and Higher Education Funding Council for England.

<sup>6</sup>Swinney P, Williams M. (2016) The Great British Brain Drain: Where graduates move and why. Centre for Cities.



## THE RESEARCH

This report presents the findings of research undertaken as part of the **THYME Project**: a Research England-funded collaboration between the universities of Teesside, Hull and York that aims to build on regional bioeconomy assets.

Relevant stakeholders were interviewed for the study to gain insight into the needs and practices of employers and universities. Stakeholders included:

- Graduate employers from small, medium and large businesses in the research region.
- University teaching staff and careers advisors from the three partner institutions.
- Relevant experts, including local enterprise partnership-based skills specialists.

The interviews were used to answer three key questions:

1. What are regional bioeconomy employers seeking from graduate recruits?
2. How do graduate recruits match up to employers' expectations?
3. What do universities do well to develop graduate employability?

Using this information, we identified opportunities for universities and businesses to collaborate in ways that both develop graduate employability and contribute to business aims or projects. The opportunities identified through this stakeholder engagement process are presented as three action plans for relevant groups in businesses and universities, which, if adopted, will develop a pipeline of graduate talent for regional employers.

# WHAT IS EMPLOYABILITY?

Previous graduate employability research<sup>7</sup> has identified that an employable graduate has the following necessary attributes:

<b>Skills</b>	Skills are used to 'do something' <sup>8</sup> . Skills include <b>technical</b> role-related skills and <b>transferable</b> skills applicable in numerous roles (e.g. project management, communication, teamwork).
<b>Knowledge</b>	Subject-specific knowledge that is learned during a degree programme and is required to be effective in a role.
<b>Personal attributes</b>	Behaviours related to someone's personality, psychology and upbringing. Examples include confidence, resilience, motivation, enthusiasm etc.

The specific skills, knowledge and attributes required to be successful, and the relative importance of each, will vary in different roles and industries.



<sup>7</sup>Yorke M. (2006) Employability in higher education: what it is - what it is not. The Higher Education Academy, York.  
<sup>8</sup>Tymon A. (2013) The student perspective on employability. Studies in Higher Education; 38(6):841-56.

# RESEARCH

## FINDINGS

### What are regional bioeconomy employers seeking from graduate recruits?

The small, medium and large employers who were interviewed seek graduates with relevant knowledge and technical skills. In addition to that, employers look for well-developed transferable skills including:

- Communication (written and verbal)
- Teamwork
- Project management
- Organisation
- Problem-solving

Where possible, employers also seek applicants with previous work experience that is, ideally, relevant to their business or sector.

When employers are making a recruitment choice between applicants with similar knowledge and technical skills, the most important factor is an applicant's personal attributes. Employers seek graduates who are:

- Motivated and self-starting
- Enthusiastic about the sector or role
- Accountable
- Adaptable
- Confident
- Ambitious
- Respectful

Overall, employers would prefer to *"hire for attributes and then train for skills"*. (Small business)

### How do graduate recruits match up to employers' expectations?

Employers thought that graduates were well trained and entered the job market with the necessary knowledge from their relevant degree: *"I think the graduates are well trained, so the knowledge is there"* (Large business). However, employers identified four key areas for growth where, in their experience, graduates are sometimes lacking in skills or awareness:

- Transferable skills: communication, project management, time management and leadership.
- Recruitment skills: an understanding and ability to sell strengths during application and interview and to navigate assessment centre tasks (where applicable).
- Professional behaviours: email etiquette and workplace behaviour including completing work during office hours.
- Commercial awareness: understanding the need to generate profit and protect profit margins.

### What do universities do well to develop graduate employability?

Employers, academics, careers service staff and skills experts collectively identified four best practice approaches that universities use to develop the skills employers seek alongside subject knowledge:

- Specific employability provision in the curriculum: e.g. compulsory skills modules that deliver employability content, such as CV writing.
- Teaching that develops transferable skills: using research-led teaching to develop transferable skills as well as subject knowledge and technical competence.
- Industry interactions in subject teaching: inviting employers to contribute to a programme e.g. via guest lectures or by setting projects for students.
- Work experience: e.g. year in industry placements, internships, consultancy project modules, which develop students commercial awareness and professional behaviours.



## ACTION PLAN FOR EMPLOYERS

“

[a student] can focus on [a project] and approach it without any preconceived experiences. They can come in and say, 'this is what you need to do'.

(Small business)

”

### Why engage with universities or recruit a graduate?

Engaging with local universities can have multiple benefits for a business. There may be opportunities to:

- Begin identifying future talent who could contribute to a business as an employee after graduation.
- Set students real-life projects that contribute to their assessment, whilst also providing potential solutions to business problems or questions.
- Give guest lectures that provide students with an insight into your industry and raise awareness of a business as a desirable future employer.
- Host students on work experience placements or internships where they can address problems or complete projects that are outside of present staffing capacity.
- Influence degree programme content in relevant subjects by participating in an employer panel.
- Publicise a company and any future employment opportunities.

- Provide an opportunity to demonstrate the contribution a business makes to the local community or its corporate social responsibility.
- Gain access to academic expertise.

Graduates from all programmes have developed high-level skills that can benefit employers including:

- Analytical and problem-solving skills.
- The ability to evaluate evidence and propose solutions to questions or problems.
- The ability to use their initiative, hold personal responsibility and make decisions in complex situations<sup>9</sup>.

Employers who participated in this research suggested that these, and other, skills gave graduates the ability to identify business improvements that increase both productivity and profit.

# ACTION PLAN

The research identified three key opportunities for businesses to collaborate with universities in ways that can benefit both the business and students' development, which are summarised in Figure 1 and explained in more detail within the extended report.



## Offer opportunities for students to gain real-world experience

Consultancy or group projects (students contribute to solving a genuine problem in your business)

Work placements (E.g. short internships or year in industry placements)



## Provide current and realistic insights into business practice and needs

Guest lectures related to your expertise

Guest talks at careers events/ in degree programme skills provision



## Support students to succeed in recruitment

Help with mock recruitment events/application coaching

Provide mentorship to students wanting to work in your industry

**Ensure that opportunities are in keeping with your business aims and capacity**

Figure 1: An action plan for bioeconomy employers identifying opportunities to collaborate with universities for mutual benefit

Employers who wish to collaborate with their local universities in these ways should approach the leaders of relevant programmes or the university careers service. Details for these contacts are usually published on university websites or can be found by reaching out to the institution through their central contact telephone number and email address.

“

If you had to put a value on the contribution of [a placement] it's a significant cost saving to the business.

(Large business)

”

# ACTION PLANS FOR UNIVERSITIES

## Why target employability and engage with employers?

Employability literature<sup>10,11</sup> and participants in this research suggest some academic staff can be reluctant to target employability because they worry it could dilute the academic integrity of their teaching, or because they do not think that it is within their skill set. However, employability metrics are one of the tools universities use to market themselves, so there is a clear incentive to embed employability within the curriculum. Engagement with local industry offers a highly effective route to increasing the employment focus of the curriculum in a sustainable way for academic staff.

Employers stated they were satisfied with students' knowledge and technical skills, whilst they identified areas for growth in students' transferable and professional skills development. Therefore, targeting employability through subject teaching would fundamentally enhance, and not detract from, degree programmes.

“

the first stage in [students'] career journey is to have that self-reflection and understanding of the skills that they've gained.

(Careers Advisor)

”

Collaborating with employers to deliver employability-targeted content can provide students:

- An industrially relevant perspective of how their theoretical learning can be applied
- Opportunities to practice applying their learning to real-world questions or problems
- Opportunities to practise professional behaviours and skills
- Insight into potential career options and how to access them.



<sup>10</sup>Sarker M, Overton T, Thompson CD, Rayner G. (2019) Academics' perspectives of the teaching and development of generic employability skills in science curricula. Higher Education Research & Development; 39(2):346-61.

<sup>11</sup>Cotronei-Baird VS. (2020) Academic hindrances in the integration of employability skills development in teaching and assessment practice. Higher Education; 79(2):203-23.

## CURRICULUM DESIGN

### ACTION PLAN

Employers frequently indicated that, assuming that applicants had the necessary knowledge and technical skills, transferable skills and personal attributes would ultimately determine their hiring decisions. Opportunities to develop students' transferable skills, attributes and

employability can be incorporated into programmes whilst also delivering subject knowledge. This research identified four key approaches to do this. These actions are summarised in Figure 2 and explained in more detail in the extended report.



#### Integrate pedagogies that develop transferable skills

E.g. presentations, group work, problem-based learning, authentic assessment self-reflection



#### Include opportunities for real-world insights in the curriculum

E.g. projects set by relevant local businesses  
Opportunities for students to meet employers e.g. guest lectures or field visits



#### Offer a variety of high-quality work experience opportunities

E.g. a year in industry, short internships, weekly placements, consultancy projects



#### Integrate specific employability provision at the appropriate stage

E.g. CV writing or mock recruitment events  
Integrate opportunities for mentorship from relevant employers

**Provide opportunities for students to reflect on their development throughout the programmes**

**Ensure that opportunities are authentic, embedded, assessed and planned at a programme level**

**Figure 2:** Curriculum design action plan for universities highlighting approaches for embedding employability-enhancing opportunities into programmes

Incorporating these approaches will allow students to develop skills that will improve their employability. Importantly, students must also be allowed to recognise they have developed those skills, so that they can effectively present them during recruitment<sup>12</sup>. Therefore, all of these approaches should be underpinned with purposeful reflection that helps students to identify their employability-enhancing skills and attributes.

To be inclusive, it is important to provide a wealth of diverse opportunities that are all underpinned by these recommendations, as not all kinds of opportunities are suitable for all students. For example, a year-long industry placement may be unsuitable for students with caring responsibilities, whereas a professional consultancy project, embedded in a module, would be more accessible. Adopting multiple approaches will also maximise the likelihood of all students being able to access at least one employability-enhancing experience.

<sup>12</sup>Sarkar M, Overton T, Thompson CD, Rayner G. (2019) Academics' perspectives of the teaching and development of generic employability skills in science curricula. Higher Education Research & Development; 39(2):346-61.

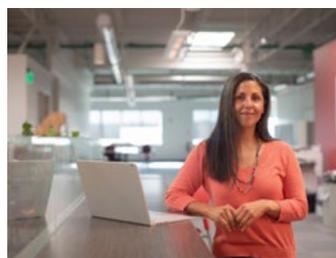
**RELATIONSHIP  
MANAGEMENT  
ACTION PLAN**

Aligned with the four actions that can be used to design employability-enhancing programmes, four actions that support the effective delivery of such programmes were also identified. These are summarised in Figure 3 and explained in more detail in the extended report.



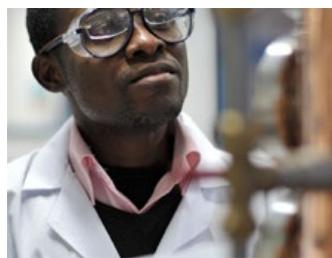
**Support academic staff to engage employers in programmes**

E.g. via an employer engagement specialist who builds relationships with numerous relevant local employers



**Provide time for academic staff to develop their understanding of relevant industries**

E.g. by providing time for staff to visit a business or take a short placement



**Provide support for employers and students to engage with work experience**

E.g. financial support for employers to offer internships or students to be able to take a placement year



**Support academic staff to embed novel pedagogies and facilitate reflection**

E.g. training or development to increase confidence to incorporate novel approaches

**Figure 3:** A Relationship management action plan highlighting support that maximises the employability-enhancing opportunities of programmes

These recommendations are based on examples of good practice, or solutions to issues, highlighted in the research. Adopting these recommendations will increase the effectiveness of the curriculum design recommendations. Collectively, the two plans for universities have the potential to enhance and maximise graduate employability for roles in the regional bioeconomy.



## CONCLUSION

- Collaboration between employers and universities can provide mutually beneficial opportunities to enhance graduate employability.
- The research that informed this report showed that regional bioeconomy employers are satisfied with graduates' knowledge and technical skills.
- Employers identified a number of areas of transferable skills and professional awareness where graduates were less prepared.
- Universities use several effective approaches that can enhance graduate employability for bioeconomy roles but the effectiveness of these could be increased with additional institutional support and industry involvement.
- Opportunities for collaboration and support to maximise graduate employability are presented in action plans for employers and for universities.
- Adopting these action plans will maximise graduate employability and support positive employment outcomes with benefits for graduates, universities and bioeconomy employers.



## SUMMARY

The THYME project has provided an exciting opportunity for the importance of skills and the right skills training within the bioeconomy to be highlighted. In order for the zero carbon targets to be met and the economy to grow and develop, the bioeconomy sector, particularly in the Tees Valley, the Humber and Yorkshire, requires current and future employees with the right skills and experience. THYME recognises the importance of multidisciplinary skills for a career in the bioeconomy. According to the Science Industry Partnership: “Biotechnology requires multidisciplinary skills, with teams of chemists, biologists and engineers needing a common understanding and ‘language”, for example,

production and process engineers with bioscience knowledge. Entrepreneurial and innovation skills are equally as important as STEM skills. As an emerging sector, the bioeconomy will provide exciting opportunities for budding entrepreneurs. The Government target of doubling the bioeconomy to £440 billion by 2030 provides future growth opportunities throughout the THYME region and, with a skilled and enthusiastic workforce, will place the region on the global stage.

**Joe Ross**

**Director, Biorenewables Development Centre**

“

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The study was part of the Research England-funded **THYME Project**: a collaboration between the universities of Teesside, Hull and York that aims to build on regional bioeconomy assets by promoting knowledge exchange between higher education institutions and regional businesses.

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