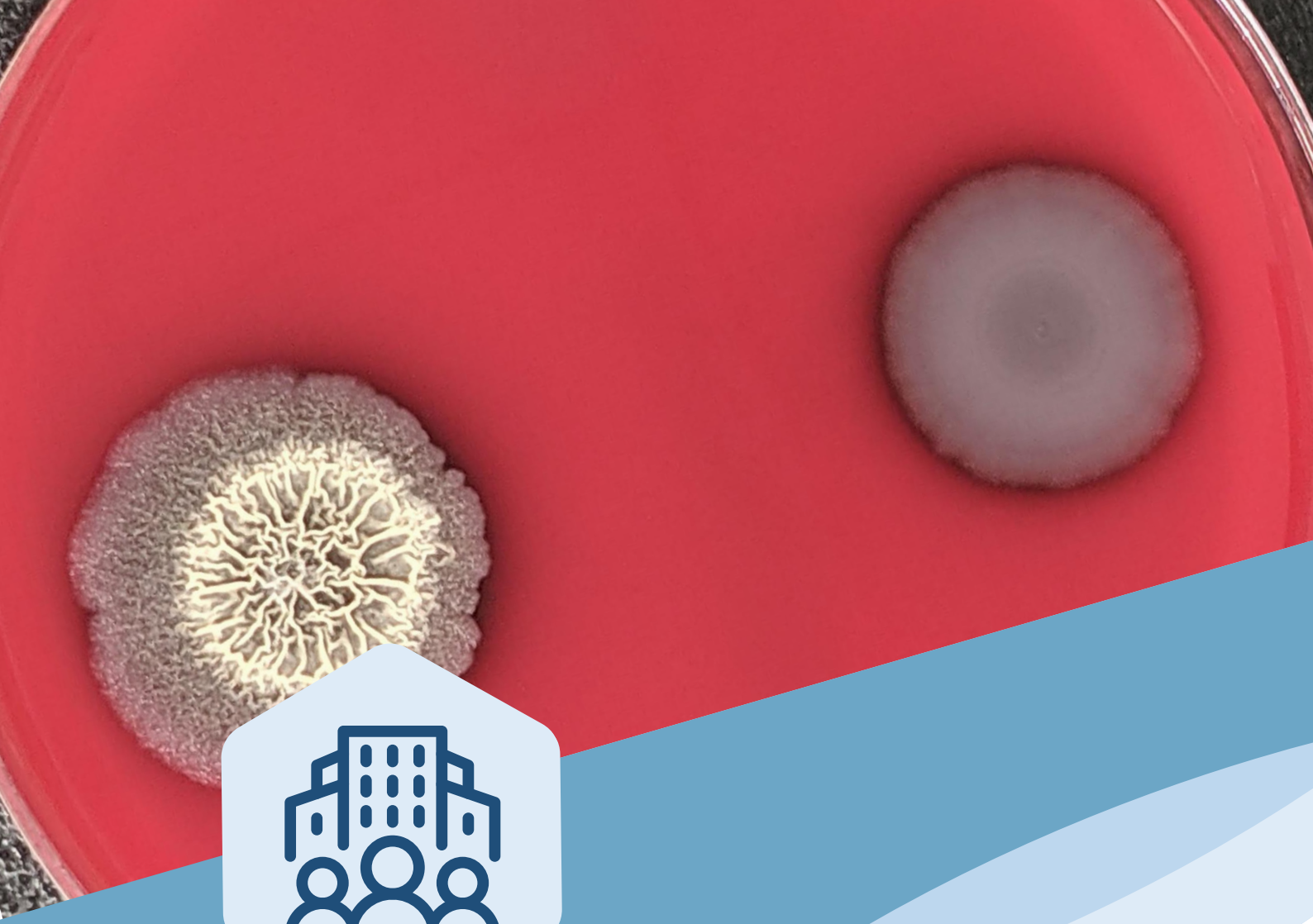


COMPANY OVERVIEW

Helping partners promote health and sustainability through microbial chemistry

ISOMERASE

Executive summary

"…The role of the infinitely small in nature is infinitely large…" - Louis Pasteur

Isomerase is an innovation partner

Isomerase is an innovation partner helping companies develop new products or processes through harnessing the microbial power of a wide range of bacteria and fungi to discover and produce native or novel molecules sustainably, cost effectively and at scale. The three areas we work on are: (1) natural products, (2) recombinant peptides, and (3) biocatalytic enzymes.

Expert at discovering, engineering, and producing natural products

Isomerase works with natural products (sometimes described as secondary metabolites) especially polyketides and non-ribosomal peptides, but also other classes such as aminoglycosides, ribosomally synthesized and post-translationally modified peptides (RIPPs), sterols and terpenes. They can be produced by a wide range of bacterial and fungal species. Isomerase excels at culturing and bioengineering these microbes. We help partners to access and work with rare and hard-to-source natural products and producing strains, to produce novel analogues of natural products and to scale-up their production.

Expert at cost competitive production of recombinant peptides

Isomerase has developed technologies for the production and supply of recombinant peptides produced using the microorganisms *E. coli* or *Pichia*. We can develop scalable manufacturing processes designed to compete economically with synthetic processes, especially at scale.

Expert at discovering, engineering, and producing biocatalytic enzymes

Isomerase supports the discovery and production of microbial enzymes for manufacture in our proprietary *E. coli* or *Pichia* systems. These enzymes either originate from microbes or are designed based upon microbial genetic sequences altered using rational or bioinformatic approaches. The enzymes Isomerase works with can be designed by Isomerase or selected by our partners. In either case, Isomerase helps to produce them at laboratory scale, to generate robust processes and to tech transfer these processes to CDMOs enabling phase-appropriate larger scale manufacture.

Microbial expertise and chemical class specific innovations

Isomerase's core knowledge, experience and capabilities with microbes, biology, chemistry, and bioprocess development underpins all we do. On top of this breadth of expertise, Isomerase has discovered and developed proprietary innovations specific to each of natural products, recombinant peptides and biocatalytic enzymes. Our innovations include EvoSelect® software for evolution guided protein design, proprietary production strains and other patented discoveries, all of which are designed to enhance partner projects.

Partners with companies developing valuable products and processes

Isomerase operates B2B with companies wanting to benefit from our microbial expertise to generate value in their products and progress their processes toward commercialisation. Isomerase has worked with companies throughout Europe and North America, ranging in size from two-person virtual operations to multinational companies serving a range of industries including pharmaceutical, diagnostic, agritech, consumer goods and functional materials.

Partners with companies pursuing sustainable manufacture

Isomerase collaborates with partners to assess the best route toward manufacture. This typically involves assessing if there are more cost effective and sustainable routes. Examples of this can involve using strain engineering approaches to alter biosynthetic pathways that avoid the need for complex chemistry steps, using improved biocatalytic enzymes in processes, streamlining the fermentation process and focusing on optimised purification methods to reduce the use of solvents and waste streams.

Company

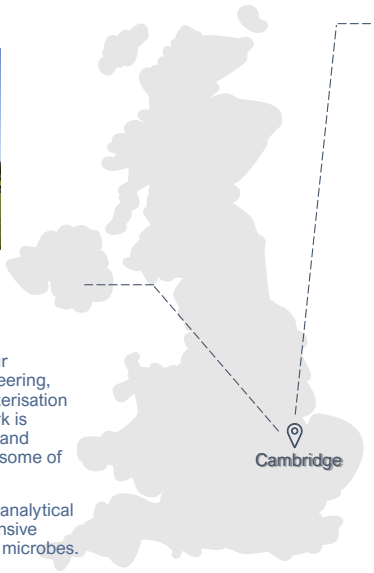
In 2013, Isomerase was co-founded by Drs Matt Gregory (Isomerase CSO) and Steven Moss (Isomerase CTO) with Prof Barrie Wilkinson (John Innes Centre). It works on both bacterial and fungal microbes to produce a range of small molecules, peptides and enzymes with companies interested in health, sustainability, or both across a range of commercial sectors.

RESEARCH FACILITY

CHESTERFORD RESEARCH PARK

Our state-of-the-art laboratory is where our synthetic biology, bioinformatics, bioengineering, strain improvement, discovery and characterisation of biocatalytic enzymes happens. The work is supported by our in-house chassis strains and collection of over 21,000 microbial strains some of which are proprietary.

It is also the location for our capabilities in analytical chemistry, preparative chemistry and extensive collection of purified small molecules from microbes.



PROCESS DEVELOPMENT FACILITY

SOLOPARK

A recent addition to Isomerase, Solopark extends our process development capabilities.

Solopark activities include development of rapid titre methods, upstream and downstream processing development and production of material from gram to kilogram scales.

Sterilisable-in-place (SIP) fermenters accommodate tens of litres, enabling method development between gram and kilogram scale and can enable technology transfer to larger scale manufacturers.

Isomerase's team has grown to 35 people, with >90% having a scientific or technical background. Our team is based on two sites, both just southeast of Cambridge, United Kingdom. Isomerase is found within the Cambridge Biomedical Cluster and ~13 miles (20 km) southeast from the University of Cambridge. Scheduled visits by current or prospective partners to either of Isomerase's sites are welcomed.

Team

All our partners have both a business development and technical point contact within Isomerase. Having dedicated named individuals ensures quality, accountability, and relationship stability, while in parallel allowing close alignment of scientific resources to the tasks in hand.

MATT GREGORY

CEO and Cofounder

STEVEN MOSS

CTO and Cofounder

KAREN REDNALL

Finance Director & HR

LESLEY SHEEHAN

VP - Operations

ANNA STANLEY-SMITH

VP - Quality

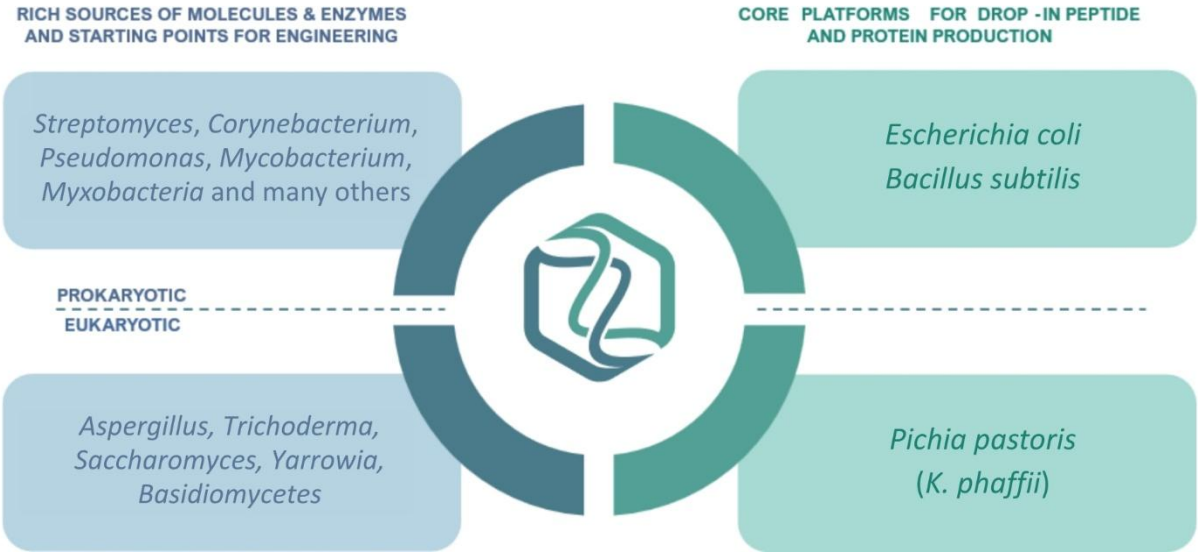
NEIL TRIGGS

VP – Bioprocessing
GM Bioprocess Facility

The **Business development contact** works with current and potential partners to interpret their needs, draft proposals for partner consideration, and put agreements in place. The **Technical contact** assembles and manages a team of Isomerase scientists best aligned to partner needs, collaborates with the partner team on the project and is responsible for project reporting and other deliverables.

Bacteria and fungi we work with

Isomerase has expertise working with a wide range of both wildtype and genetically modified bacteria (prokaryotes) and fungi (eukaryotes), developing *de novo* genetic engineering platforms, conducting process development and developing bespoke media and processes for production of secondary metabolites and other products of interest. We have selective markers, vector backbones, gene editing tools and transformation methods that can be changed and used in various strains.



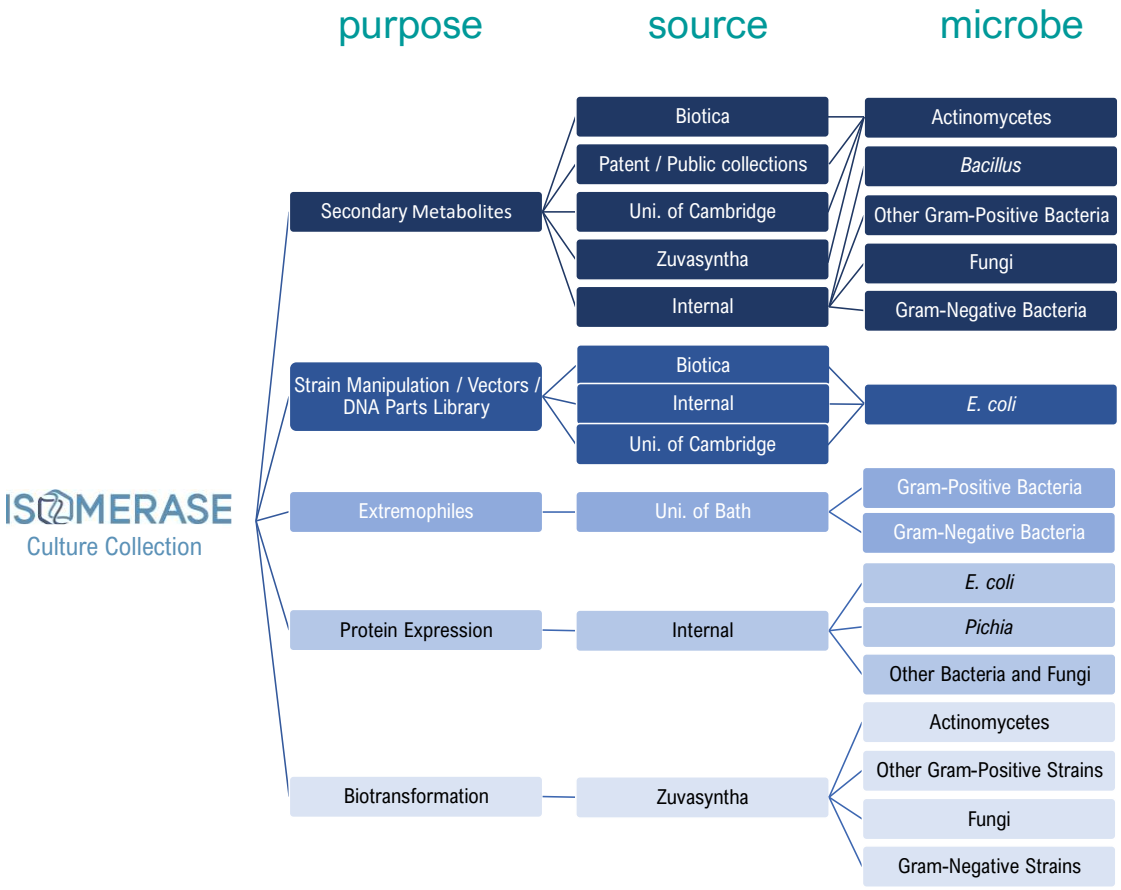
Isomerase has built an extensive collection of more than 21,000 strains, many proprietary, that can be used as the basis of new projects. Additionally, we are experienced in accessing patented strains and other commercial collections.

Strain collection

Isomerase uses the strains themselves, molecules they produce and genomic information they contain to inform enzyme discovery and design. These are all valuable resources Isomerase uses in support of partner projects. The schematic below provides and overview of Isomerase's collection.

Isomerase's strain collection is made up of sub-collections targeted for different purposes including a secondary metabolite panel (including 1000s of novel actinomycetes), microbes used for stain manipulation, vector and DNA parts library propagation, an extremophile panel, strains for use in protein expression (especially *Pichia* and *E. coli*) and biotransformation panel. Some of these strains have heritage in Industrial use.

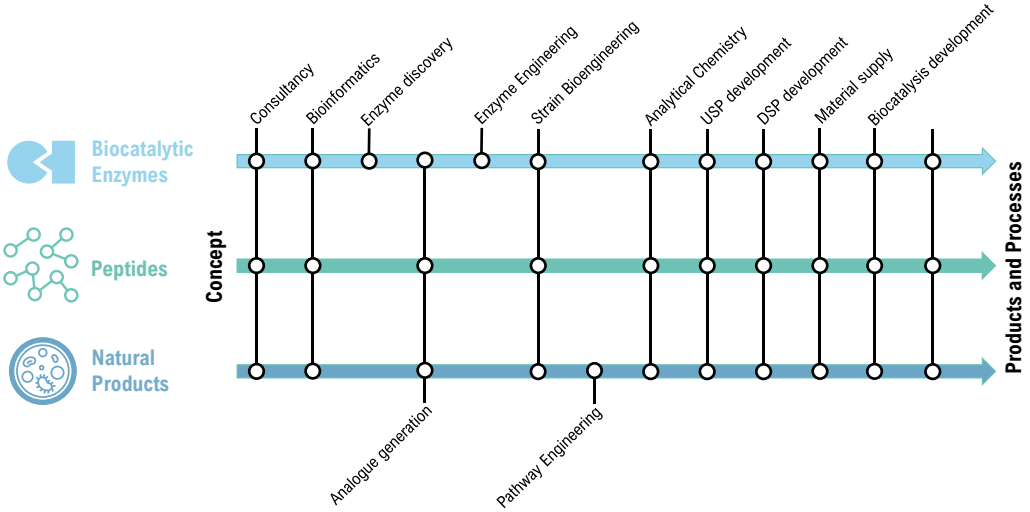
The source of Isomerase's collection is diverse and includes Biotech (e.g., Biotica, Zuvasyntha), Academia (Universities of Cambridge and Bath) and Ex-Pharma. Isomerase's collection is Nagoya compliant. Isomerase continues to explore ways of adding further to our collection.



Isomerase uses the strains themselves, molecules they produce and genomic information they hold to inform enzyme discovery and design. These are all valuable resources Isomerase uses in support of partner projects.

Approaches taken

Isomerase helps our partners on their journey from value creation to commercialisation, illustrated below from left to right. A common destination is a scalable process for producing molecules of interest. Isomerase helps find scale-up groups and then we can support the transfer of technologies that we have developed on behalf of our partners.



Ways we work with partners

To best align with partner needs Isomerase offers flexible options for working together that can be varied in response to partner requirements over time. Full-time equivalent (FTE) partnerships work best for discovery-based projects where flexibility is needed over time on the studies to be conducted. Fee-for-service (FFS) contracts are suited to partnerships where a defined set of studies are required. Isomerase innovations can be contributed toward partner projects, under simple terms if needed.

HELP FURTHER DEVELOP YOUR PLANNING	COMPLEMENT YOUR RESEARCH TEAM	ACCELERATE ACHIEVEMENT OF GOALS	INCLUDE OUR INNOVATIVE SOLUTIONS
As consultants, Isomerase helps to develop or evaluate plans to assess hypotheses and/or advance programmes toward market.	Isomerase scientists may become or expand your research team, to help make new discoveries, on a full-time equivalent basis.	As your programmes transition from research to development, Isomerase can help complete defined milestones, fee for service.	Isomerase accelerates or inspires new avenues of research, through providing access to rare strains and materials, our advanced processes, and other licensable inventions.

Ways to contact Isomerase

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www.isomerase.com

LinkedIn