

Next Big Innovation Labs®

TRIVIMA

PRECISION BIOPRINTING ASSURED.

ABOUT NEXT BIG INNOVATION LABS

Deep Tech Engg.

Patented 3D Bioprinting technology developed to build products in-house and customised for researchers based on their requirements (Trivima)

Innoskin[®]

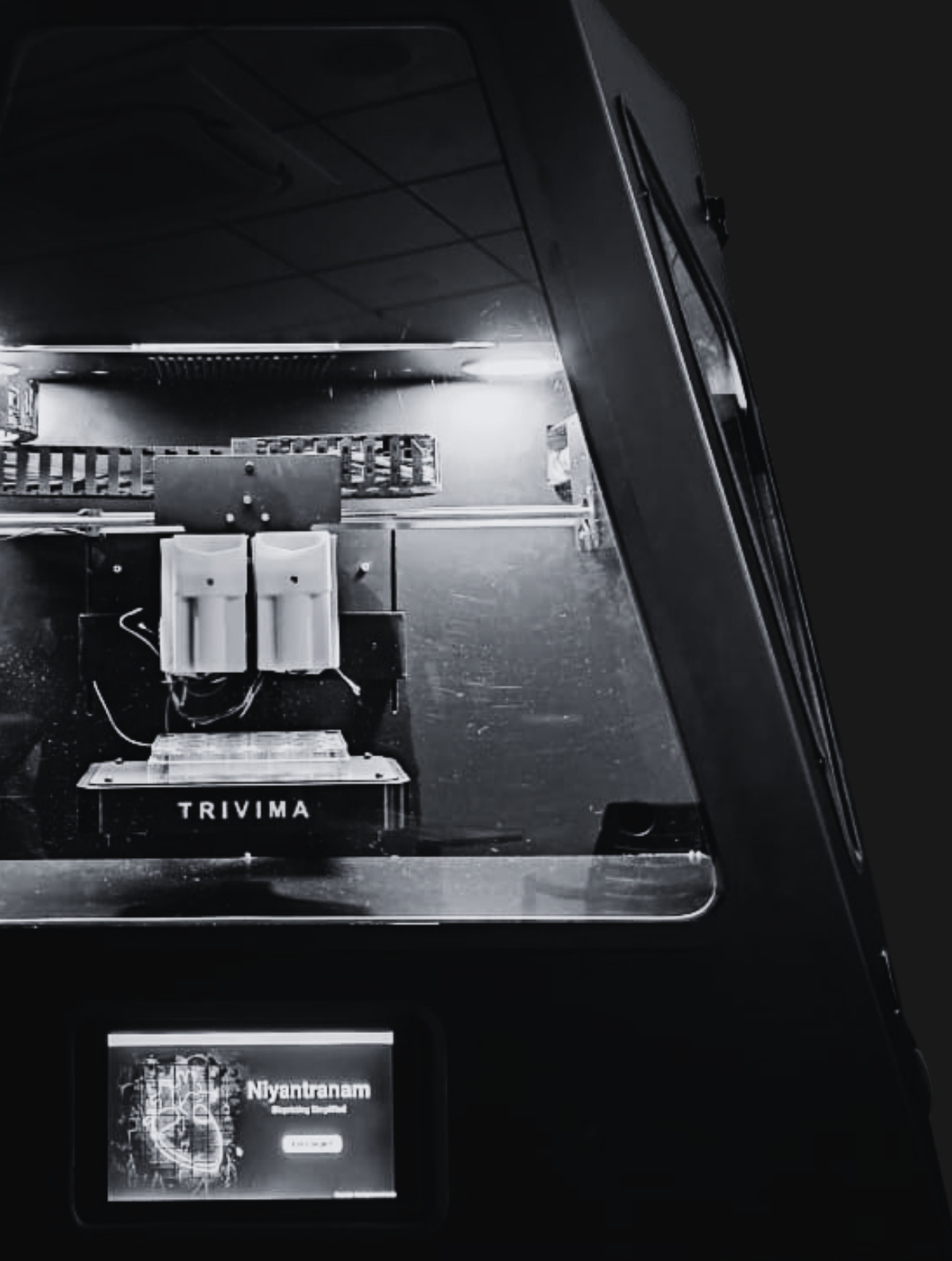
3D Bioprinted Human skin aimed at long-term clinical applications with short term applications as an alternative to animal testing

Next Big Learning

A deep technology learning platform that takes you through the various nuances and intricacies involved in bioprinting tissues and features the latest developments in the domain

FOUNDED

MAY 2016



TRIVIMA PRO

Bioprinters



Status Quo of Bioprinters in India

Current Commercial Bioprinters do not cater to any form of modularity, are priced really high and do not have good service support in India. Modularity of bioprinters is key to ensure they provide an impetus to the bioprinting protocols.

Bioprinters available in the market are not modular and do not allow for future upgrades post procurement

High End Bioprinters are extremely expensive, do not allow for modularity and some do not provide even basic temperature control features

Service of Bioprinters and Future Upgradability is key to ensuring the effectiveness of the application of the technology. 95% of Bioprinter manufacturers are outside India.

JUST PURE METAL.



About Trivima Bioprinters

Modular | Upgradable | Technically Validated

Macro-Level Modularity Options

Number of Extruders

Upto 4 Extruders

Temperature Control

On Extruders & Bed

Extruder Heads

Pneumatic to Inkjet

Photo Crosslinking

UV, Blue & Visible

About Trivima Bioprinters

Modular | Upgradable | Technically Validated

Micro-Level Modularity Options

Extruder
Heads

Pneumatic
Heads

Inkjet
Head

Melt Extrusion
Head

Filament
Extruders

Coaxial
Extruders

Bed and
Fixtures

4°C to 125°C
Temp Range

35 & 60 mm
Petri Plates

6, 12 & 24
Well Plates

FRESH
Fixtures

96 & 384
Well Plates



About Trivima Bioprinters

Modular | Upgradable | Technically Validated

Micro-Level Modularity Options

Bioprinting Modes

Continuous Extrusion

Sequential Extrusion

Tandem Extrusion

Transwell Extrusion

Multi-Well Extrusion

Chamber and Software

H14 HEPA Filter

Germicidal UV Light

Chamber Temperature

Customised Software

Multi-Printer Support



About Trivima Bioprinters

Extruder Heads



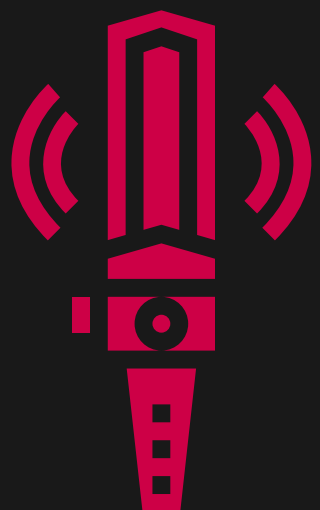
PNEUMATIC PRINT HEAD

Fine tuned over years of applications across a wide and diverse range of polymers and biomaterials, Trivima's pneumatic print heads can take on almost most materials used in bioprinting.



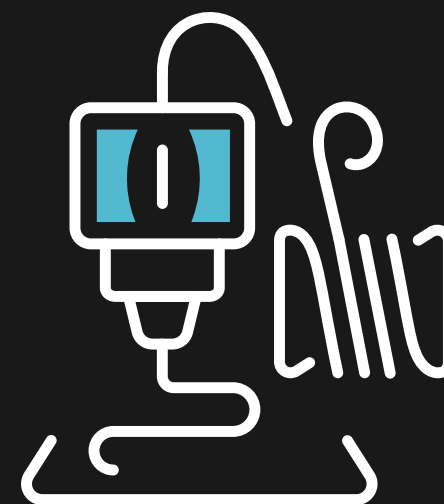
INKJET PRINT HEAD *

From Picolitre Dispension to 700 Microlitre dispension, Trivima's inkjet printheads are truly made for diverse inkjet bioprinting and printing applications and are also temperature controlled



MELT EXTRUSION HEAD

Trivima's stainless steel melt extrusion heads allow you to work with diverse pellet based printing applications. This head allows you to widen your approach to bioceramics and polymer printing by reaching temperatures of 250°C



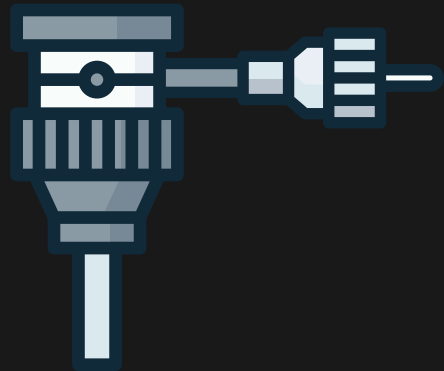
FILAMENT PRINT HEAD

From Medical Grade PCL to PEEK to PLA to ABS, Trivima's fused deposition modelling head is well suited to print a wide range of filaments with extruder temperatures upto 200°C

About Trivima Bioprinters

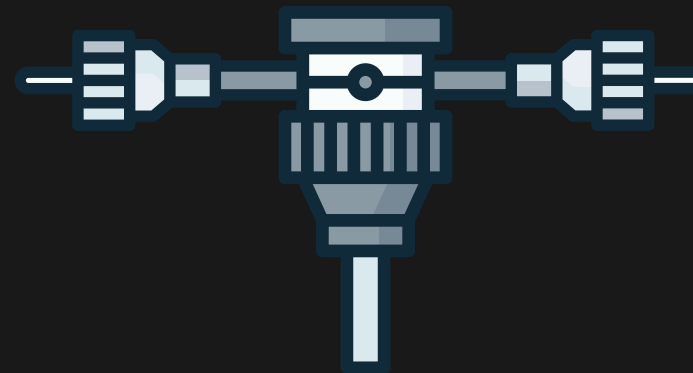
Extruder Heads

COAXIAL BIOPRINTING HEADS



Be it vasculature or complex tubular structures, Trivima's coaxial system integrated with our world class software allows you to print coaxial structures with complex architectures.

TRIAxIAL BIOPRINTING HEADS *



Tubular structures are not always simple and straight forward. With Trivima's Triaxial print heads, you can now print with three different biomaterials and explore sacrificial polymers too!

*Triaxial Print-Heads are only available with Trivima Pro Configurations that feature four or more extruders.

About Trivima Bioprinters

Bioprinting Modes



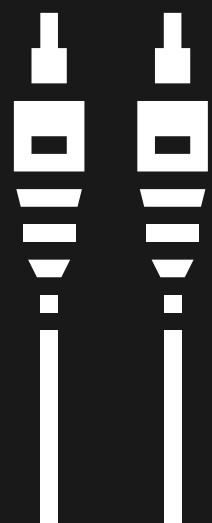
TRANSWELL BIOPRINTING

Transwell membranes create one of the toughest substrates for bioprinting. Trivima bioprinters are fitted with fine tuned movement control systems to ensure scaffolds are printed in 6, 12 and 24 well plate trans well formats allowing for effective cell deposition and wall to wall printing within the trans well.



FRESH BIOPRINTING

Customised bed fixtures in Trivima bioprinters allow for a variety of bioprinting substrates. The FRESH Bioprinting fixtures allows you to print tissues within gel constructs effortlessly.



TANDEM BIOPRINTING

Trivima's software is well integrated to support tandem printing where one can print with two biomaterials at the same time by calling two or three extruder heads. This allows for highly complex scaffold architectures and multi-cell layering



MULTI-WELL BIOPRINTING

Trivima's precision pneumatic systems and optimised inkjet systems are ideal for droplet dispensing in any type of well format. The integrated software supports 6, 12, 24, 48, 96 and 384 well plate droplet dispensing applications. Ideal for organoid creation and precise cell positioning.

About Trivima Bioprinters

Modular | Upgradable | **Technically Validated**



Synthetic+Natural Bioinks

Polycaprolactone has been used widely for various tissue engineering purposes. An optimised mix of polycaprolactone and gelatin based bioink was effectively printed using Trivima.



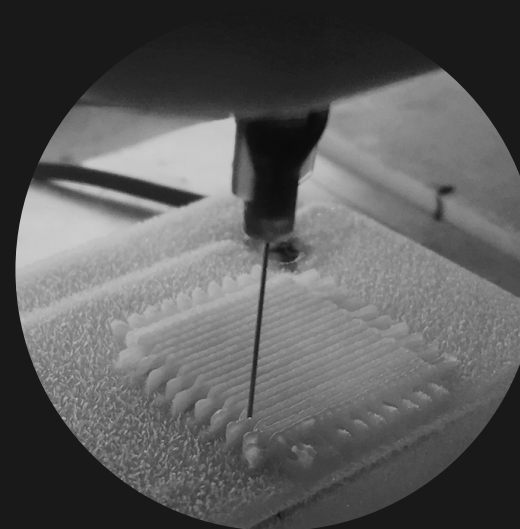
Pure Synthetic Biomaterials

Trivima's bioprinting technology has been deployed to print pure synthetic polymers such as PLCL. The prints were only a few millimeters thin and were used by researchers for wound healing studies.



Bioceramic Biomaterials

Bioceramics such as Beta TCP are difficult to print in a slurry state. With Trivima's unique temperature control technology, scaffolds that were 2 centimeters in height were achieved.



Pure Natural Biopolymers

Always taunted as a difficult biomaterial to print, our scientists have been able to successfully bioprint using collagen based biomaterials with effective crosslinking strategies and temperature control.

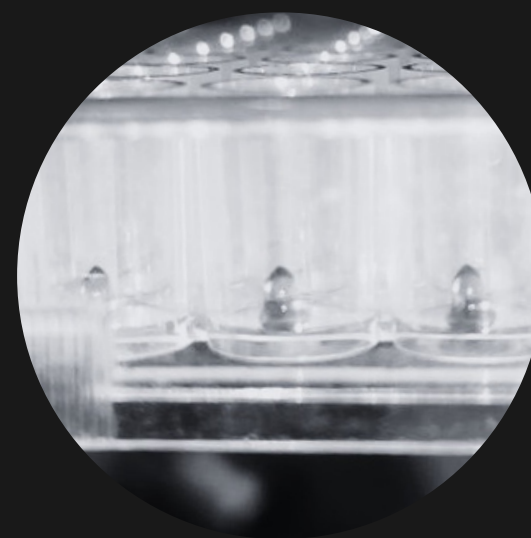
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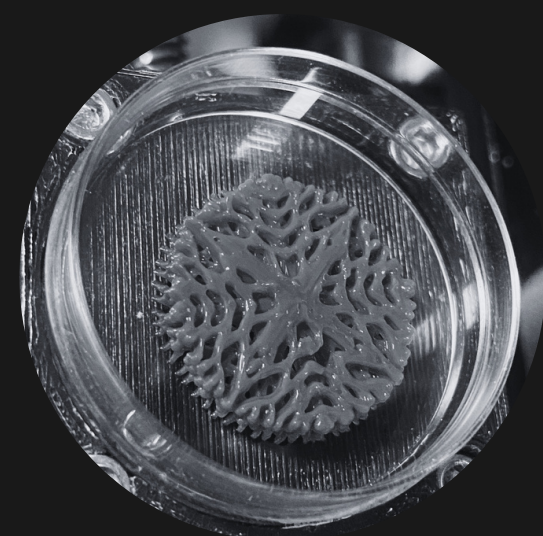
GELMA (UV Based Bioprinting)

The UV modules in Trivima are developed in-house and have been tested extensively. Trivima's UV modules have been used to bioprint GELMA based hydrogels for skin based applications.



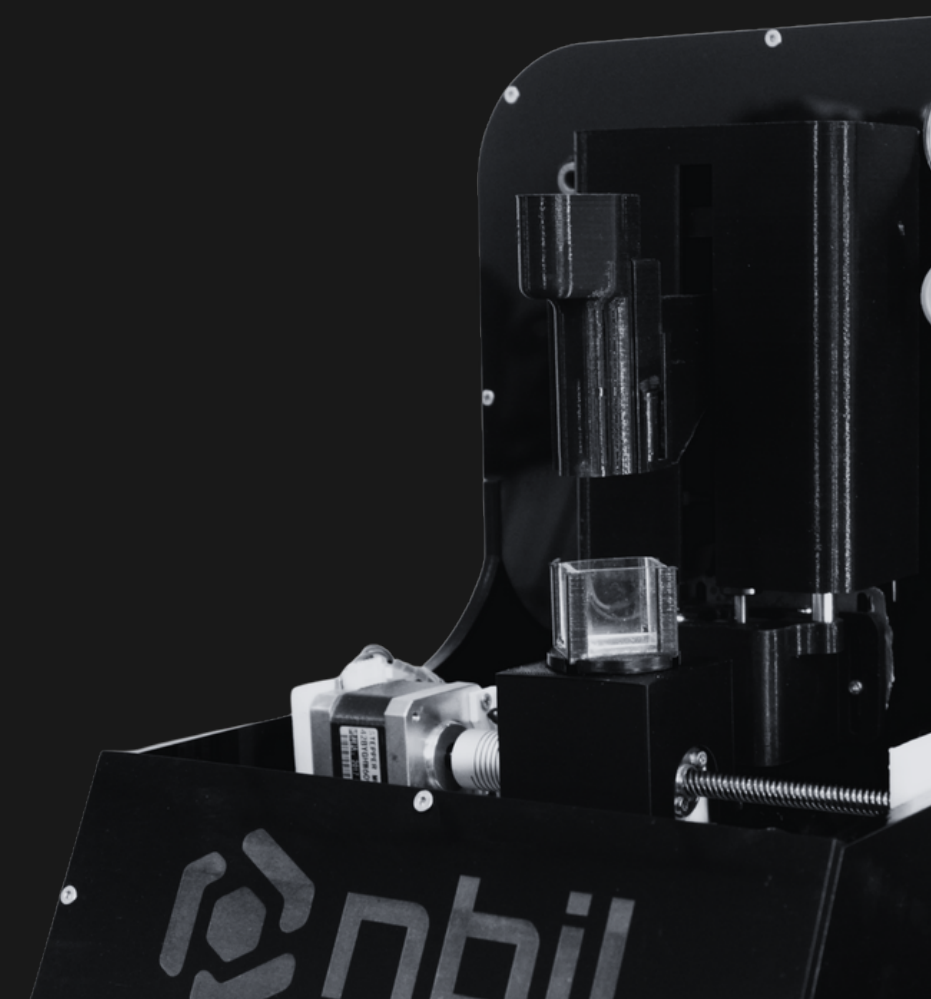
COLMA (Visible Light BP)

The versatility of Trivima's light based crosslinking modules allow researchers to bioprint across a wide range of light based biopolymers. Commercial biomaterials such as COLMA have been successfully bioprinted using Trivima.



Intricate Design Bioprinting

Our Engineering is used internally to bioprint the human skin, an organ that requires great precision during scaffold construction. This principle is translated to our customised bioprinters as well and allows for high precision movements and controlled biomaterial/cell deposition



| Applications of Trivima Bioprinters



TISSUE ENGINEERING



CANCER RESEARCH



DRUG DISCOVERY



REGENERATIVE MEDICINE



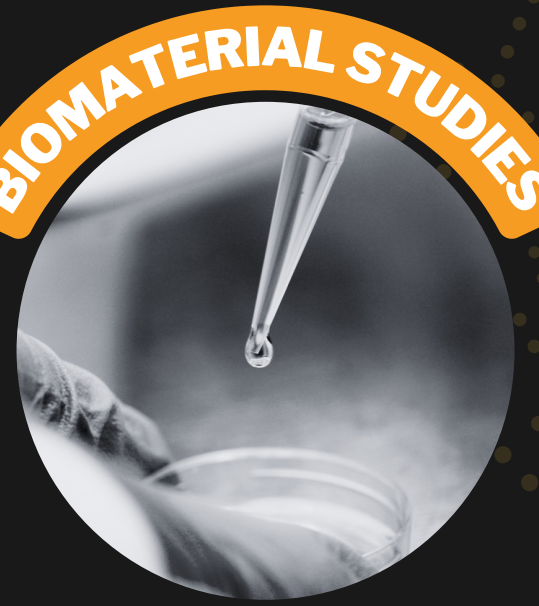
PERSONALISED MEDICINE



MICRO-FLUIDICS



BIOPRINTED MEAT



BIOMATERIAL STUDIES

| Technical Specifications | Trivima Pro Bioprinters

FEATURE	TRIVIMA PRO
Number of Print-Head Slots	4
Print-Head Temperature Range °C	4°C to 80°C (Pneumatic Heads)* 210°C (Melt Extruder Heads)** 250°C (FDM Extruder Heads)***
Temperature Control on Bed	4°C to 125°C
Photo-Crosslinking (nm)	365, 405, 485, 520
H14 HEPA and Germicidal UV	Yes
Calibration	Manual and Automatic
Substrate Fixtures	Slides, Well Plates and Petri Dishes
Precision	<10µm
Build Volume (L*B*H)	150*100*100 mm
Pressure Range	Zero to 8 Barr
Tissue Type	Soft and Hard Tissues
Compatible Biomaterials	Natural, Synthetic and Bioceramic

FEATURE	TRIVIMA PRO
User Interface	Niyantranam by NBIL
Niyantranam OS Compatibility	Windows OS
In-built Slicing Capabilities and G-Code Generation	Yes (Upto 5 User Defined Scaffold Designs)
Frame	Carbon Steel
UV Safety Features	Yes
Weight	60 Kilograms

| Best in Class Post - Installation Support

QUICK TECHNICAL SUPPORT

BIOMATERIALS ASSISTANCE

SCAFFOLD DESIGN SUPPORT

BIOPRINTING CONNECTS

COLLABORATIONS

Next Big Innovation Labs®

TRIVIMA

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