



# 3D PRINTING CLUB

## INFINITE PRINTER PROJECT

### *PROJECT REPORT*

# TEAM MEMBERS



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- Likes to play games
- Watches travel vlogs
- Loves to design
- Expresses it through 3D modeling and illustrations
- Planning to get into a good consulting firm



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- A creative thinker
- Motivator
- Likes to swim
- Loves to cook and also a foodie
- Change ambassador



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- Likes to play sports
- Watches movies
- Plays video games



**ATISH GAYKAR**

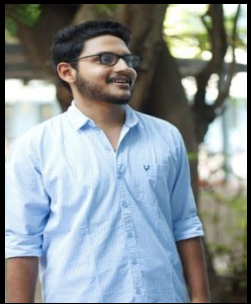
**ED19B046**

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- Interested in automotives
- Planning a career towards that
- Likes to go out and roam
- Enjoys his time spending with friends
- Loves to sleep too

**SANTHI PRASANNA****AE19B045****sanpr03@gmail.com**

- Interested in improving technology in defense, spacecraft
- Foodie
- Loves to paint and does craft works
- Web Series addict

**KOUSHIK ABHIRAM****CE19B008****abhiramch02468@gmail.com**

- Likes to hang out with friends
- Movies and series addict
- Explores new places and new food items
- Has interest in coding
- Enjoys team projects

**ARAVIND CHOWDARY****CE19B099****aravindrocks369@gmail.com**

- Interested in designing and coding
- Sleeps a lot and a foodie
- Roams a lot with friends
- Loves nightlife
- Likes working in a team

**SOHANA PREETH****ME19B008****sohanabandi@gmail.com**

- Reads a lot of books
- Watches movies
- A foodie
- Loves to solve new problems or challenges

**BHARATHI VEERASANKAR****BS19B031****bharathiveerasankar@gmail.com**

- Likes cooking
- Enjoys painting
- Watches series
- An average bookworm
- Loves to read classics and Russian literature

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# OVERVIEW OF THE PROJECT

Ever since the 3D printing technology was invented, everyone was so fascinated about it. From reducing costs to increasing efficiency to spurring innovation, many people are excited about the impact that 3D printing will have on the future of manufacturing. However, the truth is, it already has made a significant impact on the industry.

It has been inspirational to see the evolution of 3D printing and to see manufacturers across all industries work together to shape the industry and economy. However, the capabilities of 3D printing are limited due to various reasons, one of them is the restrictions on the build volume. The variety of products that can be printed are limited by these constraints.

The infinite 3D printer has an ability of printing infinitely in one or more directions, thereby, making the printer more usable to print a wide variety of parts, of any length. Usage of a conveyor belt as the bed rather than a static bed reduces the manual effort needed and increases the production rate.

Our project is to build an infinite printer which is low cost and efficient. Two models, of similar kinds of projects, are used for reference in building our printer. Detailed analysis, of all parts of the printer, is done for both the models and the modified features are included in our build.

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## BRIEF HISTORY

3D Printing was only an idea in the 1980s. In 1981, Hideo Kodama of the Nagoya Municipal Industrial Research Institute in Japan discovered a way to print layers of material to create a 3D product. Unfortunately, Kodama was unable to get his patent for the technology approved. Finally in 1986, an American engineer named Charles Hull created a prototype for a process called stereolithography (SLA). Hull used photopolymers, also known as acrylic-based materials, to evolve from liquid to solid using ultraviolet lights. Hull is commonly referred to as “the father” of 3D printing.

With the foundation of the technology already created, in the 1990s, companies began experimenting, expanding and, ultimately, commercializing 3D printing. However, the technology was still cost prohibitive. As a result, adoption was limited to high-cost, low-volume product production. Thus, it became a natural fit for prototyping new products in the aerospace, automotive and medical industries.

2005 marked the year that 3D printing went on the path to becoming more mainstream. Many of the early patents began to expire, and inventors and entrepreneurs sought to take advantage. When the FDM patent fell to the public domain in 2009, more companies were able to create a variety of 3D printers and the technology became more accessible. 3D printing began making mainstream headlines, as concepts such as 3D printed limbs and 3D printed kidneys were fascinating and potentially powerful.

As the cost of 3D printers continued to decline, in 2010s, the demand for the technology began to soar, and they became more commonplace in the home and in businesses. People were now free to make and create new products on their own, without relying on companies or technology firms. This empowering shift is fueling The Maker Revolution, which values creation and focuses on open-source hardware.

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## BACKGROUND WORK DONE

- Initially, we learned the basics of the 3D printing process through a few tasks in which we understood about 3D Modelling, FDM process, basic electronics (Arduino), etc.
- After that we started working on our project by looking into some models of infinite printers, which we are going to replicate. We analysed the differences between conventional printer and infinite printer.
- Later, we started preparing the BOM for two models (Hackaday and NAK) according to Indian market and also replicated the CAD files.
- Few team members looked into the firmwares and controller boards which would be suitable for our infinite printer build.
- Conveyor belt mechanism and parts required were also analysed by all members through a task in which we designed our own model. We made our designs by searching suitable rods, ball bearings, pulleys, motors, etc.
- A final design for the conveyor belt is made from combining all individual ideas and all components were chosen such that there are less flaws.

## HACKADAY MODEL

### DESCRIPTION:

3D printing has the potential to democratize manufacturing. Since 3D printers are easy to use and low cost, they allow anyone to make incredibly complex things. The technology has opened up new doors to makers and hackers.

However the capabilities of 3D printers are limited by requirement of human operation. Therefore, the purpose of this project is to build a fully autonomous 3D printer. A 3D printer that can print a continuous stream of parts without user interaction. The finished machine is capable of independently ejecting and starting print jobs. Additionally, the 3D printer's conveyor belt mechanism allows it to make infinitely long prints. The Automatic Infinite 3D Printer (i3D) allows any small business, organization, and person to leverage the power of a factory.

### BOM:

[https://docs.google.com/spreadsheets/d/1BDI0ikldU4Bmr3j6-9P4A-wu2XGgvdup-vBwgx8\\_Dik/edit?usp=sharing](https://docs.google.com/spreadsheets/d/1BDI0ikldU4Bmr3j6-9P4A-wu2XGgvdup-vBwgx8_Dik/edit?usp=sharing)

### CAD FILE:

<https://a360.co/2Avasf2>



## BOM:

- General parts BOM including bars and extrusions - [https://docs.google.com/spreadsheets/d/1hB1N3bMQy4oyiEpYa6kWzU-z3\\_Pffgil65vruX6uFWI/edit?usp=sharing](https://docs.google.com/spreadsheets/d/1hB1N3bMQy4oyiEpYa6kWzU-z3_Pffgil65vruX6uFWI/edit?usp=sharing)
- BOM of other parts - <https://docs.google.com/spreadsheets/d/1IImA0AjtIttQRZ6b1jSweibUifNarNksC72ddTGKDDM/edit?usp=sharing>

## CAD FILES:

FILES	LINKS
Extrusion templates	<a href="https://github.com/NAK3DDesigns/White-Knight/tree/master/Extrusion%20templates">https://github.com/NAK3DDesigns/White-Knight/tree/master/Extrusion%20templates</a>
Fusion 360 files	<a href="https://github.com/NAK3DDesigns/White-Knight/tree/master/Fusion%20360%20files">https://github.com/NAK3DDesigns/White-Knight/tree/master/Fusion%20360%20files</a>
Printer STLs	<a href="https://github.com/NAK3DDesigns/White-Knight/tree/master/Printer%20STL's">https://github.com/NAK3DDesigns/White-Knight/tree/master/Printer%20STL's</a>
Tools STLs	<a href="https://github.com/NAK3DDesigns/White-Knight/tree/master/Tools%20STL's">https://github.com/NAK3DDesigns/White-Knight/tree/master/Tools%20STL's</a>
STL files (squire files)	<a href="https://github.com/NAK3DDesigns/White-Knight/tree/master/Squire%20Files/STL%20Files">https://github.com/NAK3DDesigns/White-Knight/tree/master/Squire%20Files/STL%20Files</a>
Fusion 360 files (squire files)	<a href="https://github.com/NAK3DDesigns/White-Knight/tree/master/Squire%20Files/Fusion%20360%20files">https://github.com/NAK3DDesigns/White-Knight/tree/master/Squire%20Files/Fusion%20360%20files</a>



## TIMELINE OF WORK TO BE DONE

MONTH	WORK TO BE DONE
June-July	Studying all parts of the printer
August-September	Building the printer
October	Analyze shortcomings
November-December	Incorporate the shortcomings
After December	A second iteration of this build or adding advanced features to the current build

## REFERENCES/BIBLIOGRAPHY

- References for preparing BOM are provided there itself.
- CAD files for the NAK model are shared as links from the website.
- Hackaday model:  
<https://hackaday.io/project/114738-automatic-infinite-3d-printer>
- NAK model: <https://www.thingiverse.com/thing:3324280>
- Firmware and controller board suitable for infinite printer :\_  
<https://m.all3dp.com/2/5-fantastic-3d-printer-controller-boards/>
- Several other websites related to 3D printing such as All3DP, Matterhackers, etc.

## WORK ACTIVITY LOG SHEET

Link to access the sheet:

<https://docs.google.com/spreadsheets/d/1LZhJO8TOQthRVokjiL20vluJ2dkplaFeE9HnTj1Fc0g/edit?usp=sharing>

