

A Look at ChIRP: What, Why, and How

Yang C. Fann, Ph.D.

Director, Clinical Informatics

Office of Intramural Research



Intramural Research Program
Our Research Changes Lives

ONE PROGRAM, MANY PEOPLE, INFINITE POSSIBILITIES



What is ChIRP?

An NIH secured
Generative AI
Environment for
exploring the
Large Language
Model (LLM)
Technologies

*Funded by ODSS and
OIR/OD*

Clinical Research Informatics Strategic Planning Initiative



ChIRP Chatbot for Intramural
Research Program

Acknowledgement

Dr. Nina Schor Deputy Director for Intramural Research, Office of the Director

Dr. Janice Lee Deputy Director for Intramural Clinical Research, Co-lead of CRISPI, Office of Intramural Research

Dr. Susan Gregurick Director of the Office of Data Science Strategy, Division of Program Coordination, Planning, and Strategic Initiatives, Office of the Director

Dr. Sean Mooney: Director of Center for Information technology

The OIR CRISPI Team

Philip Chiang; Bryant Jen; Nitin Kumar; Ylang Tsou

Office of the Director (OD)

Nick Andrade; Evelyn Botchway; Etan Kuperberg; Dr. Alison Lin; Dr. Steevenson Nelson; Rashod Qaim; Carlos Sanchez; Chris Sowards; Honghou Zhou

Center for Information Technology (CIT)

Olanrewaju Balogun; Wayne Chen; Jonathan Coleman; Henrique Ludwig; Geoffrey Marsh; Warren Mattocks; Ben Richmond; Mike Stump; Nick Weber, Maureen Falvella, and CIT Office of Communications and Outreach

National Heart, Lung, and Blood Institute (NHLBI)

Dr. Nick Asendorf; Robyn Wyrick

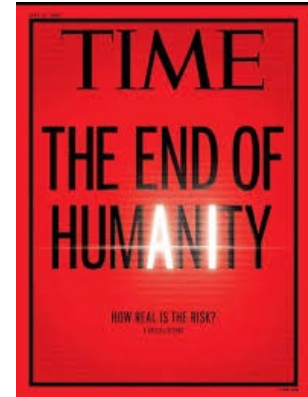
National Institute of Aging (NIA)

Dr. Faraz Faghri; Dr. Michael Nalls

National Institutes of Neurological Disorders and Stroke (NINDS) Linpei Fan

New Artificial intelligence (AI) Era

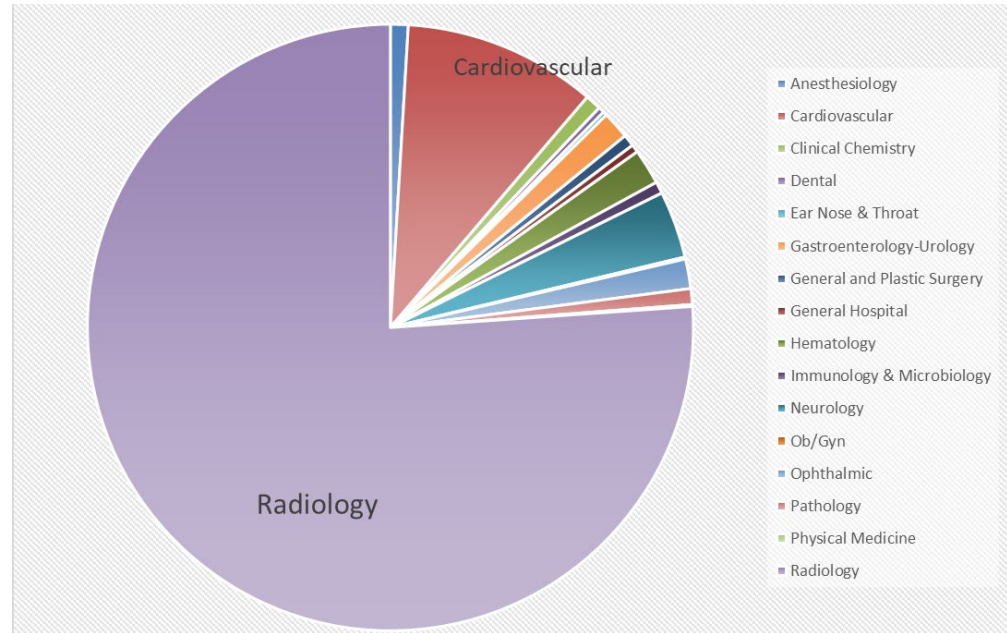
AI has become an integral part of our everyday lives. It uses data from our daily activities—such as text, images, and sounds—and employs machine learning (ML) algorithms to identify objects or patterns. This capability enables AI to make predictions, assist in decision-making, and automate various tasks. Examples include virtual assistants like Siri and Alexa, as well as self-driving cars.



AI Advances in Medicine



FDA Approved Medical AI Devices



<https://www.nejm.org/ai-in-medicine>

Evolution of Generative AI and LLM?

Generative AI (GenAI):

Generative AI is a type of Artificial Intelligence (AI) evolved from Neural Network and that can create new content similar to training datasets from text, images, or music that it has learned; it can help write a new article, create artwork, or compose a song, etc.

LLM (Large Language Model):

A Large Language Model is a type of GenAI such as ChatGPT that's specifically focused on understanding and generating human-like language. These models are trained on vast amounts of text data from sources like books, websites, and articles. By analyzing this data, they learn the nuances of language, such as grammar, context, and even some level of reasoning.

These technologies are what power things like advanced chatbots, content creation tools, and even some virtual assistants. They enable computers to understand and interact with humans in a more natural and intuitive way.

Commonly Known LLMs

Large Language Model Name	Creator
GPT-4o (<i>ChatGPT</i>)**	OpenAI
Claude 3	Anthropic
Mistral	Mistral AI (<i>France</i>)
Grok-2	xAI
Llama 3.2	Meta AI
Gemini 2.0	Google

***Currently deployed in ChIRP*

Why We Need ChIRP?

Concerns have been raised regarding the uploading of confidential and sensitive information, such as PII, or unpublished research, to public AI platforms. It is essential to protect NIH data, ensuring privacy and confidentiality while safely exploring effective uses of this technology.

NIH Committee on Scientific Conduct and Ethics (CSCE) Recommends:

1. Establish an IRP-wide secure LLM environment
2. Establish an IRP-wide governance group
 - *IRP AI/ML Task Force (chaired by Dr. Richard Scheuermann, NLM SD)*
3. IRP AI landscape survey to inform IRP AI policy and guideline
4. Provide staff training on proper use of GenAI technology (e.g. *understand its limitations and responsible uses*)

What Could We Use ChIRP for?

Help engaging interactions, enhancing productivity, streamline processes, and provide valuable insights across various topics!

- *Language (grammar, translation, conversation, text creation)*
- *Content Research and Data Analysis (e.g. literature mining)*
- *Creative and Design Tasks (e.g. Art and Music)*
- *Education (e.g. Tutoring and Learning)*
- *Technological Development (e.g. Coding)*
- *Customer Support and Interaction (e.g. 24/7 chatbot)*
- *Brainstorming and strategic Planning (new project/product idea or personalized recommendations)*
- *Personalized Assistant*

Google vs LLM (e.g. ChatGPT)

Google

- Searches for information across billions of websites
- Provides links to the most relevant websites based on your query
- Great for finding specific facts, news, and websites quickly
- Results are organized by relevance and reliability (*with some commercial influence, e.g. sponsored ads*)

ChatGPT

- Understands input language and “**generates**” human-like text
- Engages in interactive conversations, answering follow-up questions
- Great for detailed answers, explanations, and creative writing
- Feels more like talking to a knowledgeable assistant than just getting numerous web links

Risks and Limitations of LLMs (ChIRP)

- **Inaccurate Information:** LLMs can sometimes provide superficial, outdated, incomplete or incorrect information due to its limited training data, data quality or generative algorithm.
- **Bias:** It can inherit biases present in its training data, leading to unfair or discriminatory responses (e.g. certain gender or ethnicity).
- **Lack of Common Sense:** ChatGPT may struggle with tasks requiring common sense reasoning, social norms or even human emotion.
- **Limited Understanding of Context:** It can misinterpret nuanced queries or fail to grasp complex subject matter (e.g. medical diagnosis)
- **Creative Limitations:** While it can generate creative content, it lacks genuine creativity and understanding of human life experience
- **Ethical Concerns:** the ethical and responsible use of AI, including privacy and misuse. (e.g. misleading contents or fake news).

How to Gain Access to ChIRP?

1. Login to <https://chirp.od.nih.gov/>
2. For first-time users, select your NIH Role: Research, Administrative, or Other.
3. Accept the Terms and Conditions.
4. If seats are available, you will be directed to your user portal.
5. If no seats are available, you will be placed on a waiting list, and an email notification will be sent to you when additional seats become available.



ChIRP User Interface

+ New Chat

Language Help

Data Analysis

Clinical AI

Demo Chat

ML Coding

Your Chats
(you may create a chat for each topic)



what is NIH?

ChatGPT Response



The National Institutes of Health (NIH) is a part of the U.S. Department of Health and Human Services and is the primary federal agency responsible for conducting and supporting medical research. NIH is composed of 27 Institutes and Centers, each with its own specific research agenda, often focusing on particular diseases or body systems. The mission of the NIH is to seek fundamental knowledge about the nature and behavior of living systems and to apply that knowledge to enhance health, lengthen life, and reduce illness and disability. The NIH funds a large portion of medical research conducted in the United States and also conducts its own research through its Intramural Research Program.



Type your message...

Type in your question (aka **Prompt**)

Attach your document for analysis



Select Model: ?

Select Temperature: ?

Print

ChIRP: Tips and Tricks

- ***Learn how to ask "clear" questions!***
(also known as "prompt engineering")
e.g. provide more context or examples to your questions
- Explore different applications, e.g. *generating idea for a presentation, help draft an interview email*
- Adopt a specific role when asking a domain or complex questions (e.g. *ask astronaut about space station*)
- ***The possibilities are limitless, so have fun and experiment with ChIRP!***

Current Limitations of ChIRP

- ChIRP is a pilot project for 6 months with limited number of participants
- Currently, only ChatGPT 4o is provided
- NIH is looking to add more LLM tools (e.g. MS co-pilot and OpenAI Enterprise, etc.)

We need your active participation and feedback!

- *If a license remains unused for two weeks, it may be reassigned to someone on the waiting list.*
- *We may also add more seats and additional models if there is significant demand from participants.*

Great Technology Comes with Responsibility

- **Privacy and Security:** *Be mindful of sharing sensitive personal information*
- **Accuracy and Verification:** *LLMs can sometimes produce incorrect or misleading information, verify facts and cross-check information from reliable sources*
- **Respect and Fairness:** *Use LLMs respectfully and avoid generating harmful, offensive, or inappropriate content.*
- **Intellectual Property:** *Avoid reproducing or distributing copyrighted content without permission.*
- **Critical Thinking and judgment:** *Don't blindly trust the outputs without considering the context and potential implications.*
- **Ethical Use:** *Ensure that LLMs are used for ethical purposes and not for activities that could harm individuals or society, such as generating fake news, engaging in cyberbullying, or spreading misinformation.*

Exciting Presentations Today

11:05 – 11:15 a.m. Ethics and Security

Celeste Dade-Vinson

Branch Chief and Senior Official for Privacy, Office of the Director

11:15 – 11:30 a.m. Prompt Engineering and Use Cases

Alicia Lillich

Emerging Technologies Specialist, NIH Library

11:30 – 11:55 a.m. Demonstration of Use Cases

Robyn Wyrick, National Heart, Lung, and Blood Institute

Dr. Steevenson Nelson, Office of the Director

Thank you for joining us today!



**ONE PROGRAM,
MANY PEOPLE,
INFINITE POSSIBILITIES**
irp.nih.gov

ChIRP Support Contact:

CRISPI-LLM@od.nih.gov