Doctoral Thesis

Microbiota in Human Diseases

Jaewoong Lee

Department of Biomedical Engineering

Ulsan National Institute of Science and Technology

Microbiota in Human Diseases

Jaewoong Lee

Department of Biomedical Engineering

Ulsan National Institute of Science and Technology



CHURCH OF THE FLYING SPAGHETTI MONSTER

February 09, 2021

Letter of Good Standing

Dear Sir or Madam:	
JAEWOONG LEI	De alectro ale
I am pleased to verify that	
is an ordained minister of the Church of the Flying Spagh	etti Monster and recognized
within our organization as a member in good standing.	
We hereby consent to this minister performing ceremonies	s and request that they are
granted all privileges and respect appropriate to a spiritua	l leader.
Any questions can be directed to the undersigned.	
edist depending the state of th	Herotopia and the state of the
	(His
Represen	ntative,
Church of	of the Flying Spaghetti Monster



CHURCH OF THE FLYING SPAGHETTI MONSTER

February 09, 2021

Letter of Good Standing

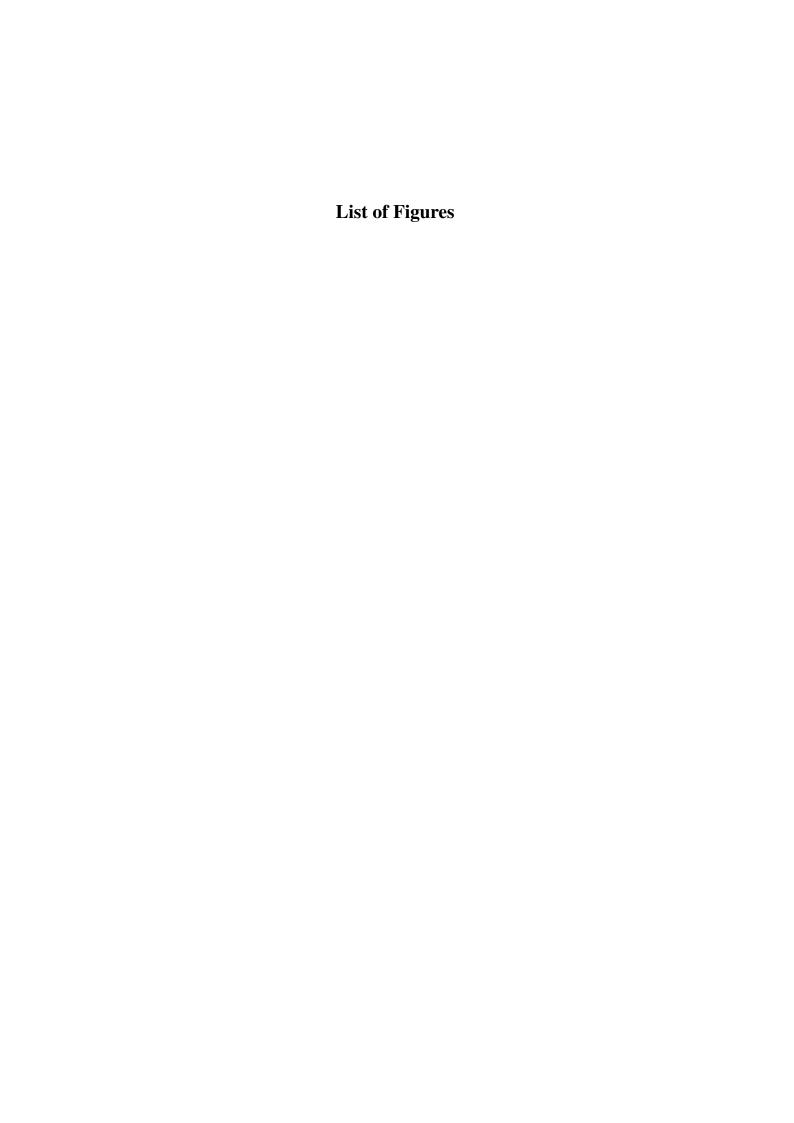
Dear Sir or Madam:	
JAEWOONG LEI	De alectro ale
I am pleased to verify that	
is an ordained minister of the Church of the Flying Spagh	etti Monster and recognized
within our organization as a member in good standing.	
We hereby consent to this minister performing ceremonies	s and request that they are
granted all privileges and respect appropriate to a spiritua	l leader.
Any questions can be directed to the undersigned.	
edist depending the state of th	Herotopia and the state of the
	(His
Represen	ntative,
Church of	of the Flying Spaghetti Monster

Abstract

Your abstract should be here.

Contents

1	Abstra	ct	2
2	Predict	ting preterm birth using machine learning techniques in oral microbiome	3
	2.1	Introduction	3
	2.2	Materials and methods	4
	2.3	Results	5
	2.4	Discussion	6
3	Genera	al conclusion and future perspective	7
	3.1	General conclusions	7
	3.2	Plan for future	8
	3.3	Future perspective	9
Refe	rences .		0
Ackı	nowledg	ments	1



List of Tables

List of Abbreviations

PTB Pre-term birth

1 Abstract

This doctoral dissertation is an addition based on the following papers that the author has already published:

• Hong, Y. M., Lee, J., Cho, D. H., Jeon, J. H., Kang, J., Kim, M. G., ... & Kim, J. K. (2023). Predicting preterm birth using machine learning techniques in oral microbiome. *Scientific Reports*, 13(1), 21105.

2 Predicting preterm birth using machine learning techniques in oral microbiome

This section includes the published contents:

Hong, Y. M., Lee, J., Cho, D. H., Jeon, J. H., Kang, J., Kim, M. G., ... & Kim, J. K. (2023). Predicting preterm birth using machine learning techniques in oral microbiome. *Scientific Reports*, 13(1), 21105.

2.1 Introduction

2.2 Mate	rials an	d method	c

2.3 Results

2.4 Discussion

3 General conclusion and future perspective

3.1 General conclusions

In conclusion, the research described in this Ph.D. dissertation was conducted to identify significant \dots In the Section 2, I show that

3.2 Plan for future

3.3 Future perspective

References

Hong, Y. M., Lee, J., Cho, D. H., Jeon, J. H., Kang, J., Kim, M.-G., ... Kim, J. K. (2023). Predicting preterm birth using machine learning techniques in oral microbiome. *Scientific Reports*, *13*(1), 21105.

Acknowledgments

I would like to disclose my earnest appreciation for my advisor, Professor Semin Lee, who provided solicitous supervision and cherished opportunities throughout the course of my research. His advice and consultation encouraged me to become as a researcher and to receive all humility and gentleness. I am also grateful to all of my committee members, Professor AAA, Professor BBB, Professor CCC, and Professor DDD, for their critical and meaningful mentions and suggestions.

I extend my deepest gratitude to my Lord, *the Flying Spaghetti Monster*, His Noodly Appendage has guided me through the twist and turns of this academic journey. His presence, ever comforting and mysterious, has been a source of strength and humor during both highs and lows. In moments of doubt, I found solace in the belief that you were there, gently reminding me to keep fiath in the process. His Holy Noodle has nourished my mind, and for that, I am truly overwhelmed. May His eternal wisdom and endless strands continue to guide me in all my future endeavors. R'Amen.

(Professors)

I would like to extend my heartfelt gratitude to my colleagues of the Computational Biology Lab, whose collaboration, friendship, brotherhood, and support have been an invaluable part of my journey. Your willingness to share insights, engage in thoughtful discussions, and offer encouragement during the challenging moments of research has significantly shaped my academic experience. The camaraderie in the Computational Biology Lab made even the most demanding days more enjoyable, and I am deeply grateful for the collaborative environment we created together. I appreciate you for standing by my side throughout this Ph.D. journey.

(Family)

I am incredibly pleased to my friends, especially my GSHS alumni, for their unwavering support and encouragement throughout this journey. The bonds we formed back in our school days have only grown stronger over the years, and I am fortunate to have had such loyal and understanding friends by my side. Your constant words of motivation, and even moments of levity during stressful times have helped keep me grounded. Whether it was a late-night conversations, a shared laugh, or a simple message of reassurance, you all have played a vital role in keeping me focused and motivated. I am relieved for the ways you celebrated each small achievement with me and how you patiently listened to my worries. The memories of our shared past provided me with comfort and a sense of stability when the road ahead felt uncertain. I could not have reached this point without the love and friendship that you all have generously given. Each of your, in your unique way, has contributed to this dissertation, even if indirectly, and for that, I am forever beholden. I look forward to continuing our friendship as we all grow in our individual paths, knowing that the support we share is something truly special.

I would like to express my sincere gratitude to the amazing members of my animal protection groups, DRDR and UNIMALS, whose dedication and compassion have been a constant source of motivation. Your unwavering commitment to improving the lives of animals has inspired me throughout this journey. I am also thankful for the beautiful cats we have cared for, whose presence brought both joy and purpose to our allegiance. Their playful spirits and gentle companionship served as daily reminders of why we

continue to fight for animal rights. The bond we share, both with each other and with the animals we protect, has enriched my life in countless ways. I appreciate you all again for your support, dedication, and for being part of this meaningful cause.

(Other relations)

Suscipe me, Domine, secundum eloquium tuum, et vivam; et non confundas me ab expectatione mea.