



**PROCEEDING
INTERNATIONAL CONFERENCE ON MATHEMATICS,
SCIENCE, AND EDUCATION**

**” Contribution of Mathematics and Science Research for
Sustainable Life in Facing Global Challenge”**

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Prof. Ir. Ibnu Maryanto, M.Si., Ph.D.
Prof. MD Rahim Sahar
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**FACULTY OF MATHEMATICS AND NATURAL SCIENCES
SEMARANG STATE UNIVERSITY**

2016

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Vol. 3 No. 1 Tahun 2016

ISBN : 978-602-1034-49-1
ISSN : 977-2477-3050-1

Publisher:

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PREFACE

Thanks to God Almighty this International Conference Proceeding could be completed. All articles in this proceeding are presented in International Conference On Mathematics, Science, and Education – Applied Research of Mathematics and Natural Sciences to Improve Its Usefulness for Knowledge and Society on September 3-4, 2016 at Grasia Hotel Semarang. This Conference is organized by Faculty of Mathematics and Natural Science. This proceeding has been reviewed of Mathematics and Science experts before it is published.

This conference is designed to improve the discussion and research scope in mathematics, science, and education area in the international level. Sub topics in this proceeding cover mathematics, applied mathematics, and mathematics education in accelerating character building. Enhancing biology and biology education research for a better life. Green chemistry in research and education. Physics and physics education for trending research. Hopefully this publication of proceeding will be profitable for all of us.

Semarang, 23 December 2016

Regards
Committee of ICMSE 2016

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MESSAGE FROM THE DEAN OF FMIPA UNNES

Dear Participants of ICMSE 2016,

It is a pleasure to welcome all of you in the first International Conference on Mathematics and Science Educations (ICMSE 2016) held by Faculty of Mathematics and Natural Sciences, Semarang State University.

Faculty of Mathematics and Natural Science Semarang State University or more popularly known as FMIPA Unnes has 6 departments and 11 study programs of Mathematics and Natural Sciences education backgrounds and non education backgrounds. FMIPA Unnes has the mission of being an excellent and meaningful faculty by improving human resources through scientific activity.

One of efforts to result excellent and meaningful human resources through scientific activity is by performing discussion and knowledge sharing. To widen discussion of science and research development in mathematics and science educations scopes in national and international level, ICMSE 2016 was initiated as the medium of that discussion. I believe that ICMSE 2016 as the first international conference held by FMIPA Unnes can facilitate the knowledge sharing in mathematics and science educations area in order to establish a global cooperation among experts and researchers.

With the hope that this conference will be the medium to optimize the role of Mathematics, Science and Education in global cooperation, I am proud to welcome all of you and I wish you a pleasant sharing and discussion in this conference and enjoyable stay in Semarang, Indonesia.

Prof. Dr. Zaenuri S.E, M.Si,Akt

Dean of Faculty of Mathematics and Natural Sciences
Semarang State University

PREFACE

We welcome you to the Third International Conference of Mathematics, Science, and Education (ICMSE) 2016 on 3-4 September 2016 in Semarang Indonesia. ICMSE 2016 is the third conference organized by Faculty of Mathematics and Natural Science, Universitas Negeri Semarang. ICMSE 2016 provides a platform to the research institutes, and industries to meet and share cutting-edge progress in the fields of mathematics and natural science as reflected in this year's theme “Contribution of Mathematics and Science Research for Sustainable Life in Facing Global Challenge”.

This conference provides an opportunity to enhance understanding of the relationships between knowledge and research related to mathematics and science. The conference accepted 234 papers from 7 countries, 8 region and from 35 universities. The conference program represents the efforts of many people. We want to express our gratitude to the members of the Program Committee, and the reviewers for their hard work in reviewing submissions. We also thank to keynote speakers Prof. Intan Ahmad, Ph.D., Mr. Robby Gunawan, Prof. Takeshi Sakurai, Prof. Roberta Hunter, Dr. Anuradha Mathrani, Dr. Arramel, and Prof. St. Budi Waluya, also the invited speaker all the participant. Finally, the conference would not be possible without the excellent papers contributed by authors. We thank all the authors for their contributions and their participation in ICMSE 2016. We hope that this program will further stimulate research in Mathematics and Science Education, share research interests and information, create a forum of collaboration and build trust relationship. We feel honored and privileged to serve the best recent developments in the field of Mathematics and Science Education to you through this exciting program.

Wish you have great memorable event and enjoyable stay in Semarang.

Dr. Margareta Rahayuningsih S.Si, M.Si.
Chairperson of Conference Committee

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