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## *Welcome Speech*

Dean of the Faculty of Tarbiyah and Education \_\_\_\_\_

*Assalamualaikum Warahmatullahi Wabarakatuh.*

Distinguish guests, speakers, participants, ladies and gentlemen, Good morning!

First of all, let's say thanks to Allah for giving us mercy and blessing, health, and opportunity for this international conference. We should also always send shalawat and salam to the Prophet Muhammad SAW.

Second, I would like to thank the rector, vice-rector, and the conference committee, especially the Head of Biology Education, Dr. Ja'far Luhtfi. Also, to the committee members of the international office, lecturers, and students who support this international conference on religion, science, and education.

This is the 4<sup>th</sup> year of the International Conference, and this time we have chosen the theme "*Harmonizing Horizons: Navigating the Convergence of Religion, Science, and Education for a Sustainable Future*". The aim is to analyze harmonization between *Religion, Science, and Education for a Sustainable Future*.

In this era of automation and artificial intelligence, there is an inherent danger that everything to become mechanical and inhumane. In this perspective, University plays an important role balancing the three pillars of the most influential fields namely religion, science, and education. The three pillars could potentially contribute to solve so many problems coming from ever changing world.

Of course, the experts we invite to this conference will discuss it in detail. I will not extend the discussion further, because together with us, the three presenters will discuss it more clearly.

I want to say to the presenters, welcome to the Faculty of Tarbiyah and Education, UIN Sunan Kalijaga, Yogyakarta. Thank you for your availability and presence to share knowledge and experience with us.

Thank you and enjoy this conference. May we all take the blessings and benefits.

*Wassalamualaikum Warahmatullahi Wabarakatuh.*

**Prof. Dr. Sigit purnama**

Dean of the Faculty of Tarbiyah and Education, UIN Sunan Kalijaga Yogyakarta.

## **The Chairperson of the Committee**

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*Assalamualaikum Warahmatullahi Wabarakatuh.*

Ladies and gentlemen, Good morning!

It is my great pleasure to welcome you all in the 4<sup>th</sup> International Conference on Religion, Science and Education organized by Faculty of Tarbiyah & Education UIN Sunan Kalijaga.

This conference is attended by around 250 participants from many regions in Indonesia and other countries, focusing on interfacing religion, science and education. Ladies and Gentlemen, religion, science and education are the very basic fundamental things related to the development of humankind. There are two challenges we encounter recently. Firstly, the development of the automation in all fields including the one that replacing human thinking. Secondly, too many procedures and inessential are becoming focus for many institutions including educational one. Both factors mention above make things are getting narrower and narrower, finally losing its dimension and essence. It is believed that the educational institutions play a significant role to solve that problems.

I would like to thank all the keynote speakers and moderator in the plenary session. I also gratefully thank to the officials at UIN Sunan Kalijaga Yogyakarta and to all of the organizing and scientific committee members and participants that contribute to this conference.

On behalf of Organizing committee, we would like to extend our apologies to everyone if we have committed any inconvenience to all of you during this conference. Finally, we wish you a fruitful and pleasant work in the conference.

Thank you very much indeed.

*Wassalamualaikum Warahmatullahi Wabarakatuh.*

**Dr. Muhammad Ja'far Luthfi, M.Si.**

Chairman of the Conference

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*Abstract from Keynote Speech*

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## Public Key (Homomorphic) Cryptography for the Post-Quantum World and its Applications

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The rapid advancement of quantum computing technology poses a significant threat to classical public key cryptosystems, which rely on computational problems such as integer factorization, discrete logarithms, and elliptic curve discrete logarithms. In anticipation of this threat, recent research has focused on developing post-quantum cryptographic schemes resistant to quantum attacks. This study presents a comprehensive overview of the evolution of public key cryptography (PKC), the limitations of existing classical schemes, and the emergence of homomorphic encryption (HE) as a crucial tool for enabling secure computations over encrypted data. In particular, this work highlights the role of Learning With Errors (LWE) and its variant, Ring-LWE (RLWE), as the primary candidates for constructing secure and efficient public key cryptosystems in the post-quantum context. The homomorphic properties inherent in RLWE-based schemes are explored through the application of mathematical tools such as the Chinese Remainder Theorem (CRT) and Single Instruction Multiple Data (SIMD) paradigms, facilitating scalable and privacy-preserving computations on encrypted datasets. To address the growing demand for secure data analysis in sensitive environments, such as the Internet of Medical Things (IoMT) and Industrial Internet of Things (IIoT), this study proposes a suite of secure linear algebra building blocks and machine learning classification frameworks operating over encrypted data. The proposed toolkit encompasses secure implementations of inner products, matrix-vector and matrix-matrix multiplications, secure summation, secure comparison, and encrypted multi-query classifications, ensuring data confidentiality throughout the computation process. Experimental evaluations and theoretical analyses confirm the practical efficiency and cryptographic robustness of the proposed methods, with security proofs established under the semi-honest adversarial model. Additionally, this research identifies several real-world applications, including secure financial technology (FinTech) services, privacy-preserving genome analysis, encrypted electronic voting systems, and secure graph theory operations. The study concludes that among currently available public key primitives, only RLWE-based cryptosystems demonstrate resistance against quantum attacks while maintaining practical homomorphic capabilities. Conversely, symmetric key cryptography and cryptographic hash functions, such as AES and SHA-3, remain secure under both classical and quantum computational models, whereas traditional public key schemes are rendered obsolete in the quantum paradigm. These findings underscore the necessity of transitioning towards post-quantum cryptographic infrastructures in critical security applications.

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## **Professional Development of Science Teachers & Sharing My Class**

***Prof. Kim Jung Bog***

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The continuous professional development of science teachers is essential for enhancing the quality of science education and fostering inquiry-based learning in schools. This study presents a reflective account and instructional model for advancing the experimental research competencies of science teachers in Korea, based on the author's long-standing teaching and mentoring experience at the Korea National University of Education (KNUE). The work discusses the current challenges faced by science teachers, including difficulties in performing experiments, a lack of inquiry-based teaching skills, and limited opportunities for practical professional development beyond mandatory training. A dedicated graduate course titled "Development of Experiments for Physics Education" is introduced, offering in-service and pre-service teachers the opportunity to independently select research topics, conduct experiments, analyze results, and prepare manuscripts for academic publication. Through this self-directed, research-oriented instructional approach, teachers not only develop practical skills but also rebuild confidence and professionalism in conducting scientific inquiry with students. Additionally, the presentation highlights the implementation of Peer Instruction (PI) and physics tutorials as interactive teaching strategies designed to improve conceptual understanding through active engagement, real-life problem applications, and hierarchical concept tests. The effectiveness of these methods is demonstrated through classroom practices, such as light propagation experiments and shadow formation analyses, enabling students to construct scientific explanations rather than relying on rote memorization. The findings underscore the importance of creating supportive research environments, peer networks, and expert guidance to cultivate sustainable experimental research culture among science educators. The proposed framework emphasizes that professional development should be both systematic and self-driven, enabling teachers to evolve into reflective practitioners capable of enhancing student learning through inquiry-based pedagogy and evidence-based teaching practices.

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## **A Meditation on Our Own Self Refinement as Educators**

***Dr. Claire Alkoutli***

*Prince Sultan University and University of South Australia.*

The relationship between educator identity and pedagogical practice is fundamental to the learning experience, particularly within traditions of holistic education. Teaching is not merely the transmission of knowledge but an expression of the educator's inner character, worldview, and personal refinement. Theoretical foundations from Islamic educational philosophy, developmental psychology, and contemporary pedagogy converge in framing teaching as an inherently moral and spiritual act, where the educator's inward state directly shapes educational outcomes. This study proposes a comprehensive framework for holistic education in which the educator embodies the ideal final forms of human development—including the soul (ruh), emotion (qalb), intellect ('aql), and self (nafs)—serving as a living model for students' integrated growth. Beyond intellectual instruction, the educator functions as a model of analytic integration, navigating complex intersections between secular and spiritual, Eastern and Western, traditional and modern perspectives. By cultivating the ability to discern truth from falsehood through refined reasoning and balanced emotion, educators help students develop the critical capacity to engage with diverse ideas while remaining anchored in moral clarity. Central to the framework is the role

of love as a developmental catalyst. Affective bonds between teachers and students, characterized by care, compassion, and consistency, are shown to be more significant for learners' long-term growth than instructional methods alone. Through love of the Creator, love of learning, and love for students, educators establish emotionally secure and spiritually rich learning environments. The model culminates in the process of soul refinement as both the objective and means of meaningful education. Educators are called to engage in ongoing personal transformation, as they cannot impart to others what they have not actualized within themselves. Education, therefore, becomes an act of spiritual transmission, contributing not only to intellectual development but to the moral, emotional, and spiritual maturity of both teacher and learner. In doing so, it restores the human being to their essential, dignified state and fulfills the higher purposes of education as envisioned within Islamic and universal humanist traditions.

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