



Returning the Earth's Call: Overview of Centuries

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The first earth day was established in April 1970 as the UNESCO initiative to honor the Earth. Our history recorded a transformative way people lived and worked triggered by the industrial revolution started around 1850. This period reshaped the global economy, which has brought social and environmental changes ever since. Modern industry came in one package with a higher emission of greenhouse gases.

The research from Our World in Data suggests that the annual emission of CO₂ significantly indicated in early 1900 at around 5 billion tons. At the end of 19 century, the emission was 4-fold times and spiking these days to around 35 billion tons. Amstrong McKay et al. (Science vol. 377, 8811, 2022) warned that this CO₂ emission contributes to the temperature rise, arctic surface decline, and sea level rise. Since 1970, the temperature has risen about 0.9°C, according to the NASA global surface temperature report by 2021. The Arctic Sea ice has melted at about a rate of 13% decline per decade. Currently, the sea level has risen 12 centimeters higher per decade, according to CSIRO.

A positive change is also evident in several actions taken after Earth Day 1970. The US Clean Air Act encourages the automotive industries to redefine their combustion technology. Although an increase of more than 37% of energy is utilized, the pollutants have decreased by about 78%, according to the EPA. New cars, trucks, and buses are 99% cleaner by utilizing today's tailpipe technology. The use of cleaner fuel, such as unleaded gasoline, has resulted in a 95% decrease in the level of lead in children's blood.

In 1987, every country in words joined the Montreal Protocol to ban CFCs. Technology today allows us to reduce ozone-depleting emissions by up to 99%. According to the UN projections, by 2050, the ozone layer is expected to return to its 1980 level. The ozone layer has stabilized and started to recover, thereby preventing an estimated 2 million cases of skin cancer per year.

In 2015, 197 countries have signed the Paris agreement which is the world's most ambitious effort to tackle climate change. All countries agreed to reduce carbon emission dramatically and to zero by 2050. Many efforts have been made to switch rapidly to renewables, conserve and restore forest and grassland, and protect coastal and ocean environments. The preservation of forests and wetlands will not only conserve biodiversity but also secure the carbon in trees and soil.

Here, everyone has a role to play, including us as scientists, engineers, or civil society.

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The administration of IJTech has implemented a policy to minimize the use of paper, plastic bottles, and packaging materials, while also promoting the use of mass transport for individual mobility. The campaign of effort and work resulting in fighting CO₂ emissions always has a place in the IJTech publications. Our editions endorsed research in technology that seemed futuristic but now exists among us, such as super batteries; biofuels from waste; hydrogen fuel cells; heat pumps; plant-based plastics; carbon capture and storage. We believe that the scaling up of this analysis will allow us to decarbonize more industries. This is the moment that we respond to our Mother Earth, to save our humanity.

This edition focuses on innovation in multiple aspects, including super batteries, biofuels from waste, hydrogen fuel cells, heat pumps, plant-based plastics, carbon capture, and also storage to save our Earth and get a more better life.

The first paper is written by A. Iztayev, S. Tursunbayeva, S. Zhiyenbayeva, G. Iskakova, A. Matibayeva, R. Izteliyeva, and M. Yakiyayeva. This paper reports the effective technologies for the development of whole-wheat flour bread using an Ion-ozone cavitation technology to time reduction for dough making and bread baking. The authors argue that the method of processing with ion-ozone cavitation technology allows the improvement of the rheological properties of the dough, the reduction of baking time by two times, and the improvement of the quality of bread from whole-ground low-quality soft wheat flour.

The second paper is written by M.A. Albugami and A. Zaheer. This paper identifies antecedents of online shopping adoption by utilizing (UTAUT) model and electronic service quality to observe the influence of these two variables on buyers' intention to adopt internet shopping. The authors argue that the integrated UTAUT model is highly significant and influences buyers' intention to adopt internet shopping for their daily needs.

The third paper, authored by S.-J. Koh and F.-F. Chua, investigates a semi-automated requirements management tool that encompasses the requirements management process by employing automated tasks through the utilization of machine learning techniques. The authors argue that the proposed tool helps the development team to manage the requirements systematically, and the prioritization algorithm is proved to work as expected by considering multiple constraints before calculating the priority value.

The fourth paper, written by M. Taleb and Y. Pheniqi, examines the significance of developing firms' intellectual capital and its role in enhancing innovation performance. The authors argue that Intellectual Capital (IC) has a positive and significant impact on Innovation Performance (IP), while Innovation Ambidexterity (IA) has a positive and significant effect on both IP and IC.

The fifth paper is written by E.O. Ningrum, I. Khoiroh, H.I. Nastiti, R.A. Affan, A.D. Karisma, E. Agustiani, A. Surono, H. Suroto, S. Suprpto, L.S. Taji, S. Widiyanto. This paper examines the formation of anodic oxide film on Ti-6Al-4V ELI (Extra Low Interstitial) alloy in 0.02 M trisodium phosphate (Na₃PO₄) electrolyte solution. The authors argue that the color appearance of Ti-6Al-4V ELI could be changed easily by altering the applied voltages, and the increase of oxide layer thickness leads to a significant decrease in corrosion rate and consequently increases the corrosion resistance.

The sixth paper, written by Rr.W.E. Mulyani, A. Nuruddin, Suprijanto, and B.S. Purwasasmita, presents a study on the modification of the hydrophilicity of polyester fabric surfaces using silica-chitosan nanocomposites. The authors argue that the coated polyester fabric with sphere silica-chitosan exhibits a rough surface and produces a contact angle approaching 0°, facilitating the polyester fabric's speed-up water absorption and hydrophilic properties.

The seventh paper is written by G. Prameswara, I. Trisnawati, T. Handini, H. Poernomo, P. Mulyono, A. Prasetya, H.T.M.B. Petrus. This paper investigated the optimum conditions of

the experimental parameters and obtained an appropriate kinetic model. The authors claim that the leaching of Dy and Yb from solid REE-hydroxide using an HCl solution resulted in a total recovery of 61.71% and 74.55% for Dy and Yb, respectively. They also assert that the leaching process was primarily controlled by chemical reactions.

The eighth paper is written by E. Sulistiawati, Rochmadi, M. Hidayat, and A. Budiman. This paper investigated the optimum Phycocyanin (PC) extraction from *Spirulina platensis* (SP), using distilled water as solvent through freezing-thawing pre-treatment. The authors claimed that the optimum yield at a water content of 81.9% (wet basis), soaking time of 6 hours, freezing time of 1 day, and a solvent-to-biomass ratio of 100 mL/g, with the optimum storage period of the raw material was one month and the phycocyanin IC₅₀ value of 1.485 mg/L.

The ninth paper is written by R. Kartika, A.H. Ritonga, L. Sulastri, S. Nurnila, D. Irawan, P. Simanjuntak. This paper observed the growth of *Scenedesmus sp.* exposed to Cr(VI) ion at various concentrations and analyzed the remaining Cr(VI) ion that did not undergo biosorption by microalgae. The authors claimed that maximum biosorption with exposure to Cr(VI) occurred at a concentration of 1.0 ppm on day 12 of 99.93%.

The tenth paper is written by Y. Yulianto and A.P.A. Mustari. This paper explored the relocation process of Al, Fe, and Pb by using the Moving Particle Semi-Implicit method. Authors claimed that Pb-Al needs 0.63 seconds, Al-Fe and Al-Pb need 1.14 seconds, and Fe-Al needs more than three seconds.

The eleventh paper is written by B.G. Irianto, A.M. Maghfiroh, M. Sofie, and A. Kholiq. This paper developed a baby incubator with an overshoot reduction system specifically for babies with heart defects that can be monitored remotely using an IoT system. The authors claimed that the data transmission test using IoT did not find data loss when sending the data, and the minimum speed required for data transmission was 5 kbps.

The twelfth paper is written by M. Orientilize, W.A Prakoso, Y. Lase, S. Purnomo, I.H. Sumartono, and W. Agustin. This paper explains the performance of the spun pile-to-pile cap connection based on the common practice in Indonesia. Authors claimed that all specimens could achieve target ductility 3, and the low confinement spun pile connections performed well in displacement ductility.

The thirteenth paper is written by R. Kosasih, D. Priadi, and M.M. Suliyanti. This paper investigated the best Pulsed Laser Deposition (PLD) coating that can minimize the damage to steel pins made of SKD61 with a hardness of 48±1 HRC. The authors assert that an AlTi1 coating is the most effective material coating. They also emphasize that the inclusion of the Ti element is crucial in enhancing properties such as hardness, wear resistance, and roughness.

The fourteenth paper is written by Riyanto, M.M. Jazuli, I. Sahroni, M.M. Musawwa, N. Cahyandar, and E.T. Wahyuni. This paper studied to conserve the underwater cannonball before storing it in a museum. Authors claimed that the *deactivation* or passivation using aqueous Na₂CO₃ 5% with a pH of 11-13 proved to be able to eliminate the concretion and prevent the corrosion of iron cannonball material objects lingering underwater.

The fifteenth paper is written by B. Pramujati, A.T. Syamlan, L. Nurahmi, and M.N. Tamara. This paper investigated a model-based control scheme for controlling the position of a suspended cable-driven parallel robot. Authors argue that the control simulation results indicate a significant improvement in control performance, i.e., reduced position error.

The sixteenth paper is written by W.N.W. Ismail, H. Adnan, W.F.W.M. Azmi, N. Yusop, S.S.M. Isa. This paper determines the factors that lead to the occurrence of delay of interim payment in government-initiated civil engineering projects in Malaysia. The authors argue

that there is a positive correlation between three major factors. These factors include project scope and design changes, ground uncertainty within the project characteristics domain, and bureaucracy in government agencies within the participants and local attitude domain.

The seventeenth paper is written by A.A.R. Setiawan, A.M.H. Putri, T.B. Bardant, R. Maryana, Y. Sudiyani, Muryanto, E. Triwahyuni, D. Dahnum, N. Rinaldi, Y. Irawan, T. Ahamed, R. Noguchi. This paper presents a comparative evaluation between two scenarios for utilizing Empty Fruit Bunch (EFB) biomass residue in the production of bioethanol. Authors claimed that the first archetype scenario could gain additional income, which equals 18.5% of Refined, Bleached & Deodorized Palm Oil (RBDPO) sales, and the integration as in the second archetype required small modification and installation, with 2% additional income 10.5 tons of daily pulp sales.

The eighteenth paper is written by T.P. Soemardi, O. Polit, F. Salsabila, and A. Lololau. This paper formulates the fabrication of a natural prepreg with poly-lactic acid (PLA) matrix and ramie fiber reinforcement by impregnating the unidirectional and bidirectional ramie fiber. Authors claimed that the freezer-stored bidirectional 0/90° prepreg laminate specimen has the highest tensile strength of 71.44 MPa with a modulus of 1.79 GPa on average, while the bidirectional ±45° prepreg laminate specimen has the highest level of elasticity, with a modulus of 0.68 GPa on average.

The nineteenth paper is written by F. Trapsilawati, F. Li, and L. Yisi. This paper provides a systematic literature review on air traffic conflict detection and resolution (CDR) in air traffic control (ATC) from ergonomics perspective and develops a framework underlying the CDR processes to retort the bounce-back of air traffic density. Authors claimed that acceleration of ATC proficiency, design of ATC systems, analysis of global traffic patterns, ATC automation transparency, and task designs enhance air traffic safety and efficiency.

The twentieth paper is written by M.H.N. Thi, N.L. Thai, T.M. Bui, and S.D. Ho. This paper examines a green phosphor $\text{Ca}_{14-x}\text{Eu}_x\text{Mg}_2[\text{SiO}_4]_8$ or CMS: Eu^{2+} to be utilized in WLED devices. Authors claim that this phosphor would be appropriate for the task of augmenting hue homogeneity, which can be applied to WLED devices possessing hue temperature measured at 5600 K and greater than 8500 K.

The twenty-first paper is written by D.R.S. Dewi, Y.B. Hermanto, S. Pittayachawan, and E. Tait. This paper formulates a systematic approach to develop and validate an instrument for evaluating the product-service systems Supply Chain (PSS SC) capabilities. The authors claim seven distinctive PSS SC capabilities constructs, namely knowledge assessment, partner development, co-evolving, reflexive control, re-conceptualization, innovative service delivery, and sustainable product-service capability.

The twenty-second paper is written by A.M. Kurniawati, N. Sutisna, H. Zakaria, Y. Nagao, T.L. Mengko, and H. Ochi. This paper presents a high throughput and low latency wireless with efficient bandwidth transmission, particularly for Medical Internet of Things (MIoT) applications. Authors argue that the 20 MHz and 40 MHz bandwidth cases show throughput improvement by around 2.3 and 2.6 times compared to the conventional ones and also provide low latency transmission by reducing the transmission time by around 50%.

In conclusion, the integration of innovation from campus laboratories with industrial and operational business has the potential to bring about significant transformations in our daily lives and work. IJTech greatly welcomes and looks forward to receiving your submissions and sharing your research with our readers.

With warmest regards from Jakarta,



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