講題: AI 時代下工程師如何做自我思維習慣訓練與科技趨勢研判 (How do engineers boost the thinking habitual skills and analytics of tech trends in the AI era?)

演講時間：2025.12.03 周三，下午 13:30~ 15:00

演講摘要：本講座的目的是與理工科同學們一起探討當前在的普遍現象及問題：AI 讓知識更普及，但也造成「假訊息、過度簡化、直覺偏誤」更易於擴散。我們需要尋找新的思維框架，讓人們能在「資訊洪流與科技爆炸」的潮流中找到真實感。從個人到集體的工程師的思維教育層次包含(a)貝葉斯式思維(Bayesian thinking)，我們要有認同不確定性、持續更新信念。AI 或機器學習正以此思路為核心；工程師養成學會「隨證據更新」的習慣。(b)偏見覺察(bias awareness)，人類容易受直覺與情緒誤導。目前設計演算法的共識是考慮避免數據偏見與倫理風險。(c)群體智慧(collective intelligence )跨學科與跨文化對話是解決複雜問題的必要因子。工程師要學會與語言學者、社會學家、政策制定者進行溝通對話。AI 時代的科技趨勢研判有三個重點如(1)建構意義(sense-making )遵循從數據 → 模式 → 敘事 → 決策的完整思考鏈。(2)情境思維(scenario thinking)強調「多重可能性」而來自非單一預測。工程師得設計多個技術未來情境，評估其風險與社會影響。(3)跨域轉譯(interdisciplinary translation)將科學知識轉化為公眾能理解的語言，這也是第三千禧年(the third millennium)思維的核心。對個人自我訓練與實踐，則透過經常進行「信念檢視」，熟悉修正假設（Bayesian updating）；記錄「弱訊號筆記本」，蒐集新興技術與社會現象。對研究團隊而言，我們可建立「跨域學習社群」，培養 集體建構意義。利用 AI 架構下大腦及機器合作，進行驗證觀點與推理。期望工程師在第三千禧年的角色已跳脫技術解題者，成為 意義建構者」與 未來的共同設計者，並常相互提醒：在這充滿雜訊與幻象的世界裡，硬核智慧不再找到唯一答案，而是持續修正、合作、並共同尋找更好的問題。

The aim of this lecture is to discuss with students from science and engineering a common phenomenon and problem: AI makes knowledge more accessible, but it also facilitates the spread of misinformation, oversimplification, and intuitive biases. We need to find new frameworks to help people find a sense of reality amidst the flood of information and technological explosion. There are three key areas for analytics of technological trends in the AI era: (1) Sense-making, which follows a complete thinking chain from data → model → narrative → decision. (2) Scenario thinking, which emphasizes "multiple possibilities" rather than sole predictions. Engineers have to design multiple future scenarios for technology and assess their risks and societal impacts. (3) Interdisciplinary translation, which transforms scientific knowledge into a language accessible to the public, is the core of third-millennium thinking. Leveraging AI-powered collaboration between brain and machine to validate insights and reasoning. We envision that engineers in the third millennium transcending the

role of technical problem solvers will become the meaning builders and co-designers of the future. We ‘d better constantly remind each other that in a world filled with noise and illusion, hard-core intelligence no longer seeks single answers, but rather continuously revises, collaborates, and collectively asks better questions.

駱榮富教授簡歷：逢甲大學材料科學與工程學系專任教授、逢甲大學儒道人文學社指導顧問、綠色化學協會亞太分會副會長(總部設於義大利)、台灣真空學會(TVS)會士(Fellow)及常務監事。曾任台灣電子書供給合作社(TEBSCo)理事主席、中華資訊素養學會(CILA)理事、逢甲大學圖書館館長及逢甲大學雲端學院執行長。廈門大學、西安交通大學、山東大學客座教授、印度理工學院坎普爾分校(IIT Kanpur)訪問教授、俄羅斯聖彼得堡 Ioffe 國立物理技術研究院訪問教授、泰國曼谷國立朱拉隆功 Chulalongkorn 大學客座訪問教授与泰國清萊府國立皇太后大學(Mae Fah Luang University)客座訪問教授、印度 Mother Teresa 大學與 Annamalai 大學博士論文之海外評審委員。美國伊利諾大學香檳校區(UIUC)材料科學及工程博士、美國壬色列理工大學(RPI)核子工程碩士、清華大學畢業。

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*Prof. Rong-Fuh Louh is the supervisor of the Electroceramics and Nanomaterials Lab of MSE department at FCU. His research interests and experiences are in the area of [1] energy materials: development and research of PEM/DMFC fuel cells, ZnS/ZnO buffer layers of CIGS thin film solar cells, electrode materials of supercapacitors, and transparent conductive films; [2] electronic ceramic materials regarding the ferroelectric ceramics, piezoelectric ceramics, functional ceramic films and ceramic gradient materials as well as development of flexible electronic material manufacturing process and component design; [3] ceramic processes such as electrophoretic deposition, sol-gel process, chemical bath deposition, continuous ion layer adsorption reaction, electrodeposited thin film coating Covering, chemical mechanical synthesis, microwave sintering, and electrospinning technologies; [4] electrophoretic self-assembly (EPSA) to fabricate opal-structured photonic crystals and 3-D ordered*

*porous materials for design of optoelectronic devices, plasmonics and metamaterials; [5] nanoscaled biomaterials with development of biomimetic materials and quantum dots; [6] ultra-precision grinding process for structural ceramics such as mirror grinding, chemical mechanical polishing, nanoscaled surface planarization, and rotary table-assisted nano-polishing; and [7] laser material processing using Nd:YAG and $CO_2$ lasers for laser cutting, drilling, and surface heat treatment.*