Dear Professor Al-Dahhan:

We are very willing to collaborate with you on the international collaboration proposal for research and education entitled “Catalytic Nanofactories to Industrial Processes: An International Collaboration”. We will be as well happy to collaborate and host Iraqi and other countries students, faculty, scientists and Engineers on the research areas of the proposal. We will be very much interested to disseminate the results and findings along with your education program and with the collaboration of St. Louis Science center.

Our current research projects in the field of heterogeneous catalysis address

- the development of environmentally benign catalytic processes for fine chemical industry like selective hydrogenation, selective partial oxidation, methylation of aromatics;
- the design of micro-structured catalytic reactors for dehydrogenation of methanol to formaldehyde, hydrogen production from methanol, and
- design, characterisation and testing of structured catalysts for gas-phase and multiphase reactions (solid-liquid-gas).

Novel catalytic materials for the reactors with structured catalytic beds are designed in the form of woven fabrics or sintered fiber membranes and present a valid alternative to conventional catalysts used as powders and granules in randomly packed catalytic beds.
In the reactors with structured catalytic beds the fluid dynamics may be imposed on the system, avoiding transport limitations (mixing or heat- and mass-transfer) and facilitating scale-up. The catalyst development is based on the knowledge derived from the reaction kinetics study under steady-state and transient conditions, the evaluation of reaction mechanism and the elucidation of catalyst active centers.

The developed catalysts are characterized by a complex of physico-chemical methods like Temporal Analysis of Products (TAP), “in situ” FT-IR and FT-Raman spectroscopy, X-ray photo-electron spectroscopy, X-ray diffraction, high resolution transmission and scanning electron microscopy (HRTEM and HRSEM), solid-state NMR, temperature-programmed (TP) desorption, TP reduction/oxidation, BET, and others. Transient response coupled with in situ spectroscopy (FT-IR & Raman) is the original and powerful characterisation technique, which has been developed in the group over the last few years.

The Laboratory of Chemical Reaction Engineering (LGRC) is a member of the European Network of Excellence IDECAT: Integrated Design of Catalytic Nanomaterials for a Sustainable Production. We have close collaboration and friendship with Prof. Gregory Yablonsky and Prof. John Gleaves, Washington University, St. Louis.

We will work with you in publishing and communicating the results to industry and the research community. We will work to seek financial support from our country to exchange visits with the members of the international collaboration.

Sincerely Yours,

Prof. Dr. Albert Renken,
Head of the Laboratory of Chemical Reaction Engineering at the Swiss Federal Institute of Technology, Lausanne