Curriculum Vitae
for
Hamdallah A. Béarat, PhD

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Current Position:

Visiting Professor of Chemical Engineering, An-Najah National University, Nablus, Palestine

Positions Held Recently:

-Senior Research Scientist & Instructor/ School for Engineering of Matter, Transport & Energy
-Affiliate Professor of Anthropology/ School of Human Evolution and Social Change
-Adjunct Faculty, College of Technology & Innovation
-Research Contractor, Agilent Technologies, Chandler, AZ
-Director & Founder of Expert Materials Analytics, DBA, a Science & Engineering Consulting Service Company, Gilbert, AZ, USA

EDUCATION

2004	**PhD**: Science & Engineering of Materials, Arizona State University, Tempe, AZ, USA
1997	**PD** (*Privat Docent*): Applied Mineralogy/Archaeometry, Fribourg University, Switzerland.
1990	**PhD**: Science: Chemistry, Caen University, France.
1986	**DEA (French eq. of Masters)**: Materials Science, Caen University, France.
1980	**B.Sc.**: Chemistry with a minor in Archaeology, Birzeit University, West Bank.

PROFESSIONAL EXPERIENCE

10/2009 to Present	Senior Research Scientist, School for Engineering of Matter, Transport & Energy, Ira A. Fulton Schools of Engineering, ASU, Tempe, AZ, USA.
07/2003 to Present	Affiliate Professor of Anthropology, School of Human Evolution & Social Change, College of Liberal Arts & Sciences, ASU, Tempe, Arizona, USA.
10/2011 to Present	Adjunct Faculty, Department Of Engineering, College of Technology & Innovation, ASU, Mesa, AZ, USA.
03/2012 to Present	Contract Application Scientist, Low Voltage Field Emission Scanning Electron Microscopy, Agilent Technologies, Inc., Chandler, AZ
01-09/ 2009	Associate Research Professor / School of Materials, ASU, Tempe, AZ, USA.
2000-2009	Faculty Research Associate, LeRoy Eyring Center for Solid State Science, School of Materials, ASU, Tempe, AZ, USA.
1999-2000	GRA, Science & Engineering of Materials Ph.D. Program, ASU, Tempe, Arizona.
1997-99	Research Associate, Archaeological Research Institute, Department of Anthropology, ASU, Tempe, Arizona.
1993-97	Senior Research Scientist and Lecturer in Archaeometry/Applied Mineralogy, Institute of Mineralogy and Petrography, Fribourg University, Switzerland.

1991-93 Post-doctoral fellow in Applied Mineralogy and Archaeometry, Institute of Mineralogy and Petrography, Fribourg University, Switzerland.

1986-90 Graduate Research Associate in Materials Science at CRISMAT Lab/ISMRa and in Analytical Chemistry and Archaeometry at the Ceramology Lab/Medieval Archaeological Research Center (CRAM), respectively, Caen University, France.

1984-85 Extensive French courses at Caen University, Caen, France.

1980-84 Teacher of general & organic chemistry and physical sciences (K 9-12), at several high schools in Ramallah district: Roman Catholic, Greek-Catholic, and Friends Boys High Schools, Ramallah, West Bank.

GRANTS & AWARDS

Pending -Exploring an uncharted pathway to the creation of a new binder based on iron powder carbonation for highway infrastructure. Proposal submitted to FHWA, October 4, 2012 in collaboration with: Narayanan Neithalath, PI and Barzin Mobasher (FSE, ASU-Civil Engineering), Kiran Solanki (FSE, ASU-Materials), David Stone (Iron Shell, LLC. Environmental) and K. G. Suresh (IIT Bombay-Physics).
- Fundamental design of multi-functional matrices based on iron carbonation . Proposal submitted to DMREF, NSF, in collaboration with: Narayanan Neithalath, PI (FSE, ASU-Civil Engineering), Kiran Solanki (FSE, ASU-Materials), Robert Marzke (Physics, ASU), David Stone (Iron Shell, LLC. Environmental) and K. G. Suresh (IIT Bombay-Physics).

2009-11 Department of Energy grant: Synchrotron X-Ray Studies of Supercritical Carbon Dioxide/ Reservoir Rock Interfaces. Grant amount: **$650,000/year** . Investigators: Hoydoo You, Argonne National laboratory, PI; Kee-Chul Chang, Argonne National laboratory, CoPI; Hamdallah Béarat, CoPI. ASU share (subcontract) is **$140,000/year**

2010-11 Arizona State University, Office of the Vice Provost for Sponsored Research, Investigator Incentive Award,. **$3,458**

2009-10 Arizona State University**,** Office of the Vice Provost for Sponsored Research, Investigator Incentive Award. **$3,458**

2005-09 Argonne National Lab Fieldwork Contract # 4F-01641 entitled: "*In Situ* Observations of Geological Sequestration Reactions and Transport Under Below-Ground Conditions". **$176,000/year.** Collaborators: Michael McKelvy, PI; Andrew Chizmeshya, PI; George Wolf, CoPI; Robert Marzke, CoPI; Hamdallah Béarat, CoPI. (Share = 20% and 55% since 2007).

2008-09 Office of the Vice Provost for Sponsored Research, Arizona State University (**$1,570**)- Investigator Incentive Award.

2006-08 Research grant for a visiting scholar from Egyptian Government to study ancient Egyptian glass materials and technology. **$15,300 for two years.**

2007-08 Office of the Vice Provost for Sponsored Research, Arizona State University (**$1,570**)- Investigator Incentive Award.

2004-06 US Department of Energy, Grant # DE-FG26-04NT42124 entitled: "A novel approach to mineral carbonation: enhancing carbonation while avoiding mineral pretreatment process cost". **$585,663.** Collaborators: Michael McKelvy, PI; Andrew Chizmeshya, CoPI; Kyle Squires, CoPI; Ray Carpenter, CoPI; Hamdallah Béarat, CoPI. (Share = 20%).

2002-04 Grant from US Department of the Interior-National Park Service (National Center for Preservation Technology & Training (NCPTT) (**$39,324**). *Mechanistic and Computational Study of Cinnabar Phase Transformation: Applications and Implications to the Preservation of this Pigment in Historical Painting*. **Principal Investigator.** Collaborators: A. Chizmeshya-ASU, A. Barbet-CNRS (France), M. Fuchs-Lausane University (Switzerland). (Share = 50%).

2002-2003 Office of the Vice Provost for Research, Arizona State University (**$491**)- Investigator Incentive Award.

2002 Faculty Fellowship, Archaeological Research Institute, ASU (one month). To conduct a survey on "the needs for archaeometry in research and teaching at ASU".

1997 Grant from the Swiss National Science Foundation (**$40,000**)-to edit and publish "Roman Wall Painting: Materials, Techniques, Analysis and Conservation" (with M. Maggetti).

1996 Grant from the Swiss National Science Foundation (**$12,000**)-for organization of the International Workshop on Roman Wall Painting, held in Fribourg, on March 7-9, 1996 (with M. Maggetti) .

1993-96 Grant from the Swiss National Science Foundation and 5 Archaeological Services (Avenches, Bern, Grisons, Fribourg, and Zurich) (**$230,000**).- scientific study of wall painting coming from 14 Roman sites in Switzerland as well as Pompeii (with M. Maggetti and A. Zurcher).

1992-93 Grant from Fribourg University (**$30,000**)- study of the wall painting of the Gallo-Roman villa of Vallon, Fribourg, Switzerland.

1992 Grant from Archaeological Service of the Canton of Zug (**$20,000**)- study of Iron Age pottery from Baarburg and Uetliberg, Switzerland (with M. Maggetti).

1991-92 Grant from Archaeological Service, Canton of Zurich (**$60,000**)- study of the wall painting of the Gallo-Roman villa of Dietikon, Switzerland (with M. Maggetti).

1991 Grant from Archaeological Service of the Canton of Zurich (**$18,000**)- study of the Medieval pottery from Winterthur, Switzerland (with M. Maggetti).

1985-90 French Government fellowship (DEA & PhD) at Caen University, Caen, France.

HONORS & AWARDS

-National Science Foundation proposal reviewer since 2003.
-Member of the following societies: Science American Chemical Society, Sigma Xi (the Scientific Research Society) , Society for Archaeological.
-Founding member of WATCH (World Association for the Protection of Tangible and Intangible Cultural Heritage during Times of War).
-United Nations TOKTEN Expert in archaeometry/archaeological conservation to the Palestinian Department of Antiquities, West Bank, summer 2004.
-Summer Institute for Materials Science & Materials Culture, MIT, Boston, MA, summer 2003.
-Faculty Fellowship, Archaeological Research Institute, ASU, Tempe, AZ, summer 2002.
-Research Internship at LANL, EES Division, Los Alamos, New Mexico, summer 2000.
-Referee for the journals:"European Journal of Mineralogy", "Archaeometry", "Journal of Archaeological Science", "Geoarchaeology", "Energy & Fuels", "American Mineralogist", "Clay & Clay Science", "Applied Clay Science", and "Journal of Supercritical Fluids".
-Organized the International Workshop: *Roman Wall Paintings: Materials, Techniques, Analysis and Conservation*, Fribourg, 7-9 March 1996.
-French Government Research Fellowship (1985-90).

RESEARCH INTERESTS

-Science & Engineering:

-In situ mechanistic & kinetic studies of solid/liquid/gas reaction processes;
-Synchrotron X-ray studies of supercritical carbon dioxide/rock minerals interaction;
-Mineral & geological sequestration of CO_2;
-Research on novel CO_2 -related technologies;
-Engineering application of CO_2 reduction;
-Solid/fluid interaction under supercritical CO_2 and H_2O for energy application;
-Materials behavior under extreme conditions (temperature and pressure);
-Materials characterization (chemical, structural, textural, and thermal);
-Low Voltage Scanning Electron Microscopy;
-Solar energy application to materials synthesis, processing, extraction and treatment;
-Solar energy conversion & storage via thermochemical cycles;

-Solar energy application to desalination and water treatment;
-Novel industrial applications of solar thermal energy;
-Geo-polymers as sustainable materials;
-Bio-mineralization and biomaterials

-Archaeometry, Anthropology & Archaeological Conservation:

-Characterization and provenance studies of inorganic artifacts (ceramics, metals, stones, clays glazes & glasses, sintered materials, pigments, paintings, plasters & binders).
-Ancient materials & technologies and their socio-cultural & economic dynamics;
-Quantitative & qualitative methods of analysis (elemental, structural, textural, and thermal);
-Corrosion, alteration, and degradation of artifacts;
-Science & engineering applications to artistic and anthropological/archaeological problems
-Ceramic analysis and manufacturing technologies
-Experimental archaeology;
-Paleo-climate, paleo-environment, and human evolution

COLLABORATIVE RESEARCH PROJECTS

I. Science & Engineering

-Collaboration with Narayanan Neithalath, and Barzin Mobasher (FSE, ASU-Civil Engineering), Kiran Solanki (FSE, ASU-Materials), David Stone (Iron Shell LLC_Environmental) on several funding proposals in the areas of cement replacement & improvement.

-Solar Thermal Energy Conversion & Storage: Herb Hayden, CTO, Southwest Solar Technologies, Inc., Phoenix, AZ.

-Synchrotron X-ray study of supercritical CO_2/reservoir rock chemical interaction. **Co-Investigator** in a DOE-funded research project in collaboration with Hoydoo You (PI) and Kee-Chul Chang (CoPI), Materials Science Division, Argonne National Laboratory.

-Materials behavior under extreme conditions: metal corrosion and fluid/rock interface under supercritical conditions. Hoydoo You and Kee-Chul Chang, Argonne National Laboratory.

-Collaboration with Edward Kavazanjian (Faculty Member, Geo-technical Engineering, ASU)on two projects: (i) Soil improvement by abiotic carbonate precipitation, a research project to be submitted to NSF (after preliminary approval); (ii) biotic precipitation of calcium carbonate for soil improvement, a research project for a PhD student, Nasser Hamdan.

- Bio-mineralization: Peter Rez (Faculty Member, Department of Physics, ASU). Collaboration in different areas of bio-mineralization and in particular a PhD dissertation work for S. Sinha relative to the early stages of biotic precipitation of calcium carbonates.

-Biomaterials: Francesco Sollis, (Faculty, Division of Mathematical and Natural Sciences, ASU West), Brent Vernon (Faculty, Bioengineering, ASU) and Hanin Béarat (PhD student in Bioengineering) : synchrotron X-ray study of chemically- & physically-gelling co-polymers for medical application.

-2000-2009: active member of ASU's CO_2 Mineral Sequestration Group and currently (**Co-Investigator)**. The group included the following faculty members: Michael McKelvy (CSSS), Andrew Chizmeshya (CSSS) Ray Carpenter (CSSS), Renu Sharma (CSSS), George Wolf (Chemistry), Robert Marzke (Physics), Kyle Squires (Mechanical Engineering) as well as 5 graduate students.

II. Anthropology, Archaeology & Art History

- Curtis Marean (Faculty, SHESC, ASU): Collaboration on four different projects: (i) The role of ochre in the development of modern human behavior: A case study from South Africa (Jocelyn A. Bernatchez, PhD student); (ii) Synchrotron X-ray contribution to human origins and paleo-environmental studies; (iii) The Origins, Appearance, and Significance of Heat Treatment Technologies in the Paleolithic of the Old World; (iv) Evidence for stone tool-assisted consumption of animal tissues prior to 3.39 Ma at Dikika, Ethiopia

-Kostalena Michelaki (Faculty, SHESC, ASU): Incrusted Neolithic ceramics from Southern Italy, a scientific study of pigments using SEM/EDX analyses.

-The nature of hunter-gatherer interaction at the Upper Palaeolithic to Mesolithic transition in Mediterranean Spain: lithics and land use in four valleys, Alicante Province, Spain. Role: PhD-Committee Member & Mentor. Collaborators: Steven Schmich (PhD student in anthropology), Geoffrey Clark (Co-Chair), Michael Barton (Co-Chair) and Michael Jochim, Member.

- Social Identity at the Edge of Empire: From the Colonial Port of Veracruz, Mexico, to the Presidios of Pensacola, Florida (1698-1763). A collaboration project with Barbara L Stark (Faculty, SHESC, ASU) for a PhD student, Krista Eschbach.

- Provenance and technology of Iron Age terracotta sculpture from Marion, Cyprus: Implications for cross-cultural and economic interactions in the eastern Mediterranean. Collaborators: Nancy Serwint, School of Art, Arizona State University & William Childs, Department of Art & Archaeology, Princeton University

- Archaeometric study of wall painting and plaster materials in the Late Byzantine- Crusades El-Khader church from Taybeh, Ramallah, Palestine. Collaborator: Vincent Michel, Maître de Conférence à l'Université de Poitiers, France.

-Science & engineering application and implications to glass art and technology, collaborative project with the Glass Department, College of Applied Arts, Helwan University, Cairo, Egypt.

-Mechanistic and Computational Study of Cinnabar Phase Transformation: Applications and Implications to the Preservation of this Pigment in Historical Painting. Role: **Principal Investigator.** Collaborators: A. Chizmeshya-CSSS, ASU, A. Barbet-CNRS (France), M. Fuchs-Lausane University (Switzerland).

-Roman Painters at Work: A Scientific Study of the Painting Materials and Techniques in the *insula* IX 12 or *The House of the Painters at Work* in Pompeii. Role: **Principal Investigator.** Collaborator: Antonio Varone (Soprintendenza archeologica di Pompei, Pompeii, Italy).

-Advancing Provenance Studies of Turquoise: Compositional, Structural, and Textural Analyses of Turquoise from Central Arizona. Role: **Principal Investigator.** Collaborator: Arleyn Simon -Archaeological Research Institute, ASU (USA).

-Continuity and change in ceramic manufacture: archaeometric study of Late Byzantine-Early Islamic transition in Jordan. Role: **Co-Chair and Mentor**. Collaborators: Khairieh Amr, National Museum of Jordan, Firas Alawneh (PhD student in the Science & Engineering of Materials Program, ASU) and Queen Rania's Institute of Tourism and Cultural Heritage, The Hashemite University, Zarqa, Jordan) as well as several other archaeologists.

-Metal production on the Early Bronze Age Hungarian Plain. Role: **PhD-Committee Member & Mentor**. Collaborators: Christopher Papalas (Graduate student in anthropology), Geoffrey Clark (Chair), Keith Kintigh, J. O'Shea, and David Killick, Committee Members.

-Analysis of Ancient Egyptian Glass and Studying its Properties for Design of Modern Artistic Glass. Role: **Co-Chair and Mentor**. Collaborative Research and Exchange Project. Neveen Salem (PhD Student) and

Mohammed A. H. Zenhoum (co-chair) Glass Department, Faculty of Applied Arts, Helwan University, Cairo, Egypt. This is a 4-year research project sponsored partially by the Egyptian Government.

-Later and Middle Stone Age Ochre Exploitation Patterns at Nelson Bay Cave, South Africa. Role: **Masters Thesis Committee Member & Mentor**. Collaborators: Jocelyn Bernatchez (GRA), Curtis Marean (Chair), and Michael Barton, Member, Department of Anthropology, ASU.

STUDENT MENTORING

Graduate Students:

Year	Student/Degree	Field of Study	Institution	Role
Current	Krista Eschbach (PhD)	Anthropology	ASU	Committee Member
2014	M. Khdour (PhD)	Electrical Engin.	ASU	Committee Member
2013	S. Schmich (PhD)	Anthropology	ASU	Committee Member
2012	J. Bernatchez (PhD)	Anthropology	ASU	Committee Member
2011	S. Sinha (PhD)	Physics	ASU	Committee Member
2010	K. Saha (PhD)	Mechanical Engin.	ASU	Committee Member
2008	C. Pappalas (PhD)	Anthropology	ASU	Committee Member
2008	N. Saad (PhD)	Applied Art	Helwan Univ., Egypt	Co-Chair
2007	V. Terrapon (M.A.)	Conservation	Ecole de Rest. La Chaux-de-Fonds, Switzerland	Chair & Mentor
2006	F. Alawneh (PhD)	Materials Science	ASU	Co-Chair
2005	J. Bernatchez (M.A.)	Anthropology	ASU	Committee Member
2001	T. Swoveland (M.A.)	Physical Geography	ASU	Committee Member

Undergraduate Students:

Currently mentoring 5 undergraduate chemical & materials engineering students (Andre Brewer, Jeffrey Nguyen, Stephen Hermens, Nancy Fujikado, Nolan Walker, and Timothy Chow) on research projects related sustainable materials and technologies.

TEACHING EXPERIENCE

2014 to Present — Teaching undergraduate courses in the Departments of Chemical Engineering and Chemistry at An-Najah National University. This included the flowing courses:

Spring 2015:
- Principles of Scientific Research & Technical Writing (64300-1, 2, 3, & 4)
- Technologies of Inorganic Chemistry (64472-1)
- Extractive Metallurgy (64574-1)
- Graduation Project 1 (64591-1)
- Preparatory General Chemistry (7001003-1)

Fall 2014:
- Principles of Scientific Research & Technical Writing (64300-2, 6, & 7)
- Special Topics in Chemical Engineering (64593-1)
- Special Topics in Chemical Technologies (64595-1)
- General Chemistry 1 (10231101-11)
- General Chemistry for Health Sciences1 (10231114-15)

2015 to Present — Teaching graduate courses in the Department of Physics at Birzeit University

Spring 2015: PHYS736: Special Topics - CO2 Sequestration

-2011-13 Teaching undergraduate and graduate engineering classes in the School for Engineering of Matter, Transport, & Energy (SEMTE), Ira A. Fulton Schools of Engineering, Tempe Campus and in the Department of Engineering at the College of Innovation & Technology (CTI), Mesa Campus, ASU:

	-Fall 2013:	MSE250-Structure & Properties of Materials (2 sections); SEMTE MSE215: Synthesis & Processing of Materials; SEMTE CHE498/HON498: Individualized Instruction; SEMTE
	-Spring 2013:	MSE250-Structure & Properties of Materials; SEMTE CHE498/HON498: Individualized Instruction; SEMTE
	-Fall 2012:	MSE250-Structure & Properties of Materials; SEMTE EGR22: Engineering Mechanics-Statics; CTI
	-Spring 2012:	EST500: Research Writing; CTI EST591: Graduate Seminar; CTI MET230: Manufacturing Engineering & Technology; CTI
	-Fall 2011:	MSE330-Materials Thermodynamics; SEMTE EGR234-Structure of Engineering Materials; CTI

2004-8 Teaching graduate & undergraduate courses cross-listed between the School of Human Evolution & Social Change (SHESC) and the School of Materials, Tempe Campus, ASU, AZ:
-ASM499-Individualized Instruction: Chemical Characterization of Glazed-Ceramics from the Late Byzantine-Early Islamic Trans-Jordan.
-ASB 591/MSE598-Archaeometry III: Advanced Characterization of Archaeological Materials;
-ASM 484/MSE484-Archaeometry I/II: Archaeomaterials & Technologies (lecture + lab).
-MSE792 (research); 2004-2007
-MSE 799 (dissertation) 2004-2007;
-Archaeological Conservation, a bloc course of 26 hours taught to archaeologists, architects, restorers of the Palestinian Department of Antiquities as part of a TOKTEN mission of the UNDP.

-1993-97 Archaeometry I (pigments, paintings, & plasters) at the Institute of Mineralogy and Petrography, Fribourg University, Switzerland.

1980-1984 Teaching of general & organic chemistry and physical science at different high schools in the Ramallah District, West Bank.

SKILLS

Analytical methods: Powder XRD (qualitative & quantitative); optical microscopy (petrography & metallography); electron microscopy (LV-FESEM, FE-SEM, E-SEM, CL-SEM and TEM); elemental chemical analysis (wet chemistry, ICP, XRF, EDS, EMPA, AAS, Ion Beam-PIXE in particular); spectroscopy: IR; Raman, Mössbauer, XPS; Thermogravimetric Analysis (TGA & DTA); synchrotron radiation analysis (X-ray micro-diffraction, X-ray reflectivity, XANES, μ-XRF, SAXS and strong interest in X-ray micro-tomography).

Computer Software: Numerous for both PC and Macintosh.

Languages: Arabic (native); fluent in English & French.

INVITED LECTURES

► Archaeometry or the Contribution of Natural Sciences to the Knowledge and Conservation of Archaeological Materials: Approach and Case Studies, Materials Advantage, Arizona State University, February 9, 2011

► Dilemma of anthropogenic carbon dioxide emission: fate, environmental consequences, and scientific & engineering challenges of its mitigation, Birzeit University, Birzeit, December 19, 2010.

► Archaeometry or the Contribution of Natural Sciences to the Knowledge and Conservation of Archaeological Materials: Approach and Case Studies, Al-Quds University, Jerusalem, December 19, 2010.

► Dilemma of anthropogenic carbon dioxide emission: fate, environmental consequences, and scientific & engineering challenges of its mitigation, Al-Quds University, Jerusalem, December 19, 2010.

► Archaeometry or the Contribution of Natural Sciences to the Knowledge and Conservation of Archaeological Materials: Approach and Case Studies, Jordan Museum, Amman, Jordan, December 6, 2010.

► Modeling and electron microscopy study of bone surface modification: case of stone tool-assisted consumption of animal tissues prior to 3.39 Ma at Dikika, Ethiopia, *Department of Physics' Chalk Talk,* ASU, October 19, 2010.

► What pigments Roman artists used? Confrontation of physico-chemical analyses with ancient texts of Vitruvius and Pliny; *Department of Physics' Chalk Talk,* ASU, January 26, 2010.

► Contribution of Natural Sciences to the Knowledge and Conservation of Archaeological Materials: Approach and Some Case Studies. *University of Arizona IGERT Seminar in Archaeological Sciences, Spring 2008,* April 11, 2008.

► Archaeometry or the Contribution of Natural Sciences to Archaeology and History of Art: Approaches and Case Studies, Queen Rania Institute of Tourism and Heritage, Hashemite University, Zarqa, Jordan, October 25, 2007.

► Archaeometry or the Contribution of Natural Sciences to Archaeology and History of Art: Approaches and Case Studies, De[artment of History & Archaeology, Birzeit University, Birzeit, Palestine, October 23, 2007.

► Carbon Dioxide Sequestration via Aqueous Olivine Mineral Carbonation: Role of Passivating Layer Formation, *Departments of Biochemistry & Mechanical Engineering, Birzeit University*, Birzeit, Palestine, July 30, 2006.

► Archaeometry or Contribution of Natural Sciences to the Knowledge and Conservation of Archaeological Materials: Approach and Case Studies, *Palestinian Department of Antiquities*, Ramallah, Palestine, July 17, 2005.

► Archaeometry or Contribution of Natural Sciences to the Knowledge and Conservation of Archaeological Materials: Approach and Case Studies, *The Franco German Cultural Centre of Ramallah*, September 4, 2004.

► Archaeometry: a Pluridisciplinary Approach to the Study of Archaeological Materials and Technologies, *ASM Seminar Series, Arizona State University*, Tempe, Arizona, USA, September 16, 1999.

► Chemical and physical alterations of archaeological ceramics*, CSSS/MRSEC Seminar Series*, Arizona State University, Tempe, Arizona, USA, October 13, 1997.

► Natural Sciences in the Service of Art and History-Les sciences naturelles au service de l'art et de l'histoire, *Habilitation, Faculty of Natural Sciences*, Fribourg University, Switzerland, June 23, 1997.

► Roman wall painting and pigments: questions and analysis*, Institut für Anorganische und Analytische Chemie*, Freie Universität Berlin, Germany, May 22, 1997.

► What is Archaeometry? Application to ancient ceramics*", The Palestinian Antiquities' Authority*, Jericho, Palestine, August 14, 1995.

► Analyses of pigments from Roman wall paintings, *Department of Cristallography and Mineralogy*, University of Barcelona, July 6, 1995.

► The study of Gallo-Roman wall paintings - Etudes des peintures murales gallo-romaines, Physical methods applied to works of art - Les Méthodes de la Physique au Service de l'Art, *3eme cycle de la Physique en Suisse Romande*, Lausanne, Switzerland, April 28, 1994.

► Quelques expériences d'altération des céramiques, Weathering Processes in Ceramics and Stone Artefacts during Burial. *NATO-CCMS-Cultural Technologies*, Bordeaux, march 17, 1994.

► The study of ancient wall paintings: materials and techniques used, analytic problems and alterations - Etude des peintures murales antiques: matériaux et techniques utilisés, problèmes d'analyse et altérations*", Colloquiums et seminares of the Institutes of Mineralogy and Geology*, Fribourg, January 5, 1993.

► Physico-chemical methods applied to archaeology: case studies, *Department of Chemistry*, Birzeit University, Palestine, July 20, 1991.

► Scientific study of ancient ceramics, *Institute of Archaeology*, Birzeit University, Palestine, July 27, 1991.

PATENTS & MUSEUM WORK

Bearat, Hamdallah A. & You, Hoydoo, A fluidic multiphase flow-through controlled system for *in situ* dynamic studies of chemical reactions under ambient-to-supercritical temperature and pressure conditions. Patent in preparation and to be filed with AzTE shortly.

Béarat H., 1996, Pigments romains de Bösingen et de Vallon-Römische Pigmente von Bösingen und Vallon, contribution to the exhibition: "*Fresques romaines: Trouvailles fribourgoises-Romisches Fresken aus dem Kanton Freiburg*", 17 fevrier-8 avril 1996, Musée d'Art et d'Histoire, Fribourg, Suisse.

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