



# FLUIDIZATION SEMINAR AND WORKSHOP

## CHICAGO, ILLINOIS, USA

### MAY 17<sup>TH</sup> – 20<sup>TH</sup>, 2022

(ALL TIMES CDT)

#### TUESDAY, MAY 17<sup>TH</sup>, 2022

7:15 AM	BREAKFAST (PROVIDED)
8:00 AM	REGISTRATION
8:20 AM	INTRODUCTION TO PSRI AND ITS TECHNICAL PROGRAMS
8:30 AM	A. INTRODUCTION AND OVERVIEW
	1. INTRODUCTION, TERMINOLOGY, AND PARTICULATE PROPERTIES
	2. FLUIDIZATION REGIMES AND TRANSITIONS
10:30 AM	BREAK
10:45 AM	3. HYDRODYNAMICS OF FLUIDIZED BEDS
	▪ EFFECTS OF TEMPERATURE AND PRESSURE
12:00 PM	LUNCH (PROVIDED)
12:45 PM	4. GAS AND SOLIDS MIXING
2:45 PM	BREAK
3:00 PM	5. GAS SOLIDS CONTACTING, REACTION, MODELLING AND SCALE-UP
	6. HEAT AND MASS TRANSFER
5:00 PM	ADJOURN

- 7:15 AM      **BREAKFAST (PROVIDED)**
- 8:00 AM      **B.      OVERVIEW OF INDUSTRIAL APPLICATIONS**
- 9:00 AM      **C.      GRIDS AND PARTICLE ATTRITION**
- **INTRODUCTION TO GRIDS (PRESSURE DROP ACROSS GRID)**
  - **DESIGN OF VARIOUS TYPES OF GRIDS**
    - **PERFORATED PLATE**
    - **PIPE/SPARGER**
    - **EFFECT OF SHROUDS**
  - **JET PENETRATION**
    - **EFFECTS OF TEMPERATURE AND PRESSURE**
- 10:00 AM     **BREAK**
- 10:15 AM     **C.      GRIDS AND PARTICLE ATTRITION (CONTINUED)**
- **SOURCES OF ATTRITION**
  - **PARTICLE ATTRITION AT SUBMERGED JETS**
    - **GRID DESIGN**
    - **EFFECTS OF TEMPERATURE AND PRESSURE**
  - **PARTICLE ATTRITION IN CYCLONES**
- 11:30 AM     **D.      WORKSHOP ON GRID DESIGN**
- 12:00 PM     **LUNCH AND LEARN WITH CPFD SOFTWARE**
- 1:00 PM      **CPFD PRESENTATION**
- 2:00 PM      **E.      PARTICLE ENTRAINMENT & ELUTRIATION**
- **INTRODUCTION**
  - **MECHANISMS OF EJECTION INTO FREEBOARD**
  - **SOLID FLUX PROFILE AND TDH**
  - **ENTRAINMENT CORRELATION FOR BUBBLING & TURBULENT BEDS**
- 2:45 PM      **BREAK**
- 3:00 PM      **E.      PARTICLE ENTRAINMENT & ELUTRIATION (CONTINUED)**
- **EFFECTS OF GEOMETRY**
  - **ENTRAINMENT FROM RISERS**
  - **EFFECTS OF TEMPERATURE AND PRESSURE**
- 4:30 PM      **F.      WORKSHOP ON ENTRAINMENT**
- **FCC/POLYETHYLENE EXAMPLES**
- 5:00 PM      **ADJOURN**

**7:15 AM      BREAKFAST (PROVIDED)**

- 8:00 AM      G.      CYCLONE DESIGN**
- PRINCIPLE OF OPERATION
  - NON-UNIFORM CYCLONES
  - DIPLEG PRESSURE BALANCE
  - FLAPPER & TRICKLE VALVES
  - EFFECT OF DIFFERENT CONFIGURATIONS
  - EFFECTS OF TEMPERATURE AND PRESSURE

**10:00 AM      BREAK**

- 10:15 AM      G.      CYCLONE DESIGN (CONTINUED)**
- DESIGN PROCEDURE
  - COLLECTION EFFICIENCY

- 11:15 AM      H.      WORKSHOP ON CYCLONES**
- CYCLONE DESIGN CALCULATIONS
  - CYCLONE VIDEOS

**11:45 AM      LUNCH (PROVIDED)**

**12:30 PM      TOUR OF PSRI RESEARCH FACILITIES**

- 2:30 PM      I.      STANDPIPES**
- THEORY OF OPERATION
  - TYPES OF STANDPIPES
  - AERATION EFFECTS
  - STANDPIPE CAPACITY
  - ANGLED STANDPIPES
  - STRIPPING
  - NON-MECHANICAL VALVES
  - STANDPIPE CALCULATIONS

**5:00 PM      ADJOURN**

7:15 AM	BREAKFAST (PROVIDED)
8:00 AM	J. DILUTE-PHASE PNEUMATIC CONVEYING AND CIRCULATING FLUIDIZED BEDS <ul style="list-style-type: none"><li>▪ VERTICAL &amp; HORIZONTAL FLOW PHASE DIAGRAMS</li><li>▪ PRESSURE DROP CALCULATIONS</li><li>▪ CALCULATION OF CHOKING, SALTATION, AND SLIP VELOCITIES</li><li>▪ FAST FLUIDIZATION, CIRCULATING FLUIDIZED BEDS</li><li>▪ BENDS</li><li>▪ EFFECT OF DIAMETER</li><li>▪ EFFECT OF PRESSURE</li><li>▪ FEEDING CONSIDERATIONS</li></ul>
10:00 AM	BREAK
10:15 AM	K. DENSE-PHASE PNEUMATIC CONVEYING <ul style="list-style-type: none"><li>▪ PACKED BED, FLUIDIZED-BED FLOW</li><li>▪ SLUG FLOW</li><li>▪ SELECTION OF EQUIPMENT TYPE</li></ul>
11:00 AM	L. PARTICLE ATTRITION <ul style="list-style-type: none"><li>▪ TYPES OF ATTRITION</li><li>▪ ATTRITION TESTING AND MODELING</li></ul>
12:00 PM	LUNCH (PROVIDED)
1:00 PM	M. MODELING GRANULAR-FLUID SYSTEMS <ul style="list-style-type: none"><li>▪ TYPES OF MODELS</li><li>▪ COMMON PITFALLS</li></ul>
3:00 PM	BREAK
3:15 PM	M. MODELING GRANULAR-FLUID SYSTEMS (CONTINUED)
5:00 PM	CONCLUSION OF SEMINAR