



**PCPG**

Pennsylvania Council of Professional Geologists  
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## **Hydrostructural Methods in Bedrock Aquifer Characterization and Remedial Decision Making**

**June 8, 2023**

DoubleTree by Hilton Reading  
Reading, PA

**September 12, 2023**

RLA Learning & Conference Center  
Cranberry Township, PA

Unlike the conceptualization of flow through a porous medium, comprehension of groundwater flow within fractured rock formations requires visualization of the three-dimensional framework of the discrete planar discontinuities through which water flows. Combining the spatial analysis of discontinuity networks with the principles and practices of traditional groundwater geology, Hydrostructural Geology provides for both the visualization and quantification of groundwater flow within structural domains of differing, sometimes overlapping, scales of observation.

Combining a refresher on the concepts of groundwater hydrology with the methods of structural geology this full day, hands-on course provides the tools of both visualization and quantification of flow in three-dimensional space. Including a complete review of the methods of planar structural analysis, the course explores: the control of geologic structure on groundwater flow within individual fractures; anisotropic responses to aquifer testing and a comparison to field anisotropy; structurally-controlled deflection of tracers and/or contaminant plumes; the effects of the scale of observation on aquifer heterogeneity and anisotropy; the hydrologic effects of fault systems; groundwater flow within structural domains of differing, yet overlapping, scales of observation.

**Level:** Advanced

### **Proposed Agenda**

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|-------------|--|
| 8:00-8:30   | Arrivals, Registration & Morning Refreshments  |
| 8:30        | Groundwater fundamentals, flow systems, aquifer architecture, plume dynamics,<br>Introduction to flow in fractured media   |
| 9:30        | Structural planes, right sections, apparent dips, stratigraphic thickness, one-point<br>problems, three-dimensional projections-problem solving session No. 1<br>Three-point problems, structural contours, groundwater contouring |
| 10:15-10:30 | Break  |
| 10:30       | Structure and topography, outcrop patterns, subsurface projections, problem solving<br>session No. 3   |
| 12:00-12:45 | Group Luncheon   |

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- 12:45      Faults, fault motion, fault solutions, planar discontinuities in rock masses, characterization, spatial and orientational distribution, statistical analysis, structural data plotting. Problem solving session No. 4.
- Hydro-Structural Geology; Structural controls on groundwater flow. Flow in planar discontinuities, structurally-controlled anisotropy, approximations and porous medium equivalents
- 2:30-2:45      Break
- 2:45            Hydro-Structural Geology - Application of structural geology to groundwater flow and contaminant transport. Immiscible, separate phase liquid migration. Problem solving session No. 5
- Hydro-Structural modeling, structural controls on contaminant dispersion and distribution, modeled prediction of transport anisotropy.
- Separate phase liquid transport in fractured media, induced anisotropy in fractured systems.
- 5:00            Adjournment / Evaluations / Sign-Out / Pick-Up Certificate of Attendance

### **About Our Presenter**

**Thomas D. Gillespie, P.G., Senior Professional Geologist (Gilmore & Associates)** – licensed professional geologist with 40 years' experience in groundwater, water resource management, engineering geology, geologic hazard assessments, environmental risk management, stormwater, mining, oil & gas exploration, site remediation. Expert hydrogeologic witness in all experience sectors at all levels of the Court System. Two consecutive six-year terms on the Pennsylvania State Registration Board for Professional Engineers, Land Surveyors and Geologists; two terms as President of that Board. National Association of State Boards of Geology, subject matter expert in structural geology, hydrogeology and engineering geology. Institutional expert consultant to the Department of the Army's Technical Assistance Team. Adjunct professor of geology at The College of New Jersey, LaSalle University; continuing education instructor of structural geology and hydrostructural geology. Founding member of the Pennsylvania Council of Professional Geologists - Board of Directors, one term. Current research in modeling groundwater flow through fractured media.