



## Dr. J.F. Devlin

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Rick Devlin's area of research is groundwater contamination and remediation, and the development of related characterization tools. He received a Pearson Medal for excellence in research in the Earth Sciences Department at the University of Waterloo, and was a recipient of an NSF Career Grant to study the use of granular iron (zero valent iron) in groundwater remediation. He was also awarded the Kemper Fellowship for excellence in teaching.

His patented inventions include the cross-injection system for introducing nutrients to aquifers for bioremediation, and the Point Velocity Probe (PVP) for the direct measurement of groundwater velocity.

### Research Projects

- Groundwater Surface Water Interaction Research
- Granular Iron Research
- Direct Measurement of Groundwater Velocity
- In situ remediation, particularly via redox manipulation and biostimulation, e.g., in situ denitrification, the cross injection system for stimulating reductive dechlorination

# Selected Papers

Cormican, A., Devlin, J.F., Divine, C. Accepted. Grain size analysis and permeametry for estimating hydraulic conductivity in engineered porous media. *Groundwater Monitoring and Remediation*.

Cremeans, M.M., Devlin, J.F., Osorno, T., McKnight, U., Bjerg, P. 2020. A comparison of tools and methods for estimating groundwater-surface water exchange. *Groundwater Monitoring and Remediation*, v. 40, no. 1, 24-34.

Cremeans, M.M., Devlin, J.F., Osorno, T.C., Nairn, R.W. 2019. Assessment of bed hydraulics and metals loadings in a passive vertical flow bioreactor in Commerce, Oklahoma. *Groundwater Monitoring and Remediation*, v.39 no.3, 40-47.

Divine, C.E., Wright, J., Wang, J., McDonough, J., Kladias, M., Crimi, M., Nzeribe, B.N., Devlin, J.F., Lubrecht, M., Ombalski, D., Hodge, W., Voscott, H., Gerber, K. 2018. The Horizontal Reactive Media Treatment Well (HRX Well®) for Passive In Situ Remediation: Design, Implementation, and Sustainability Considerations. *Remediation Journal*, v. 28, 5-16.

Cremeans, M., Devlin, J.F., McKnight, U., Bjerg, P. 2018. Application of new point measurement device to quantify groundwater-surface water interactions. *Journal of Contaminant Hydrology*, v. 211, 85-93.

Osorno, T., Devlin, J.F. 2018. An in-well point velocity probe for the rapid characterization of groundwater velocity at the centimeter-scale. *Journal of Hydrology*, v. 557, 539-546.

Gibson, B., Devlin, J.F. 2018. Laboratory validation of a point velocity probe for measuring horizontal flow from any direction. *Journal of Contaminant Hydrology*, v. 208, 10-16.

Firdous, R., Devlin, J.F. 2018. Surface carbon influences on the reductive transformation of TCE in the presence of granular iron. *Journal of Hazardous Materials*, v. 347, 31-38.

Cremeans, M., Devlin, J.F. 2017. Validation of a new device to quantify groundwater-surface water exchange. *Journal of Contaminant Hydrology*, 206, 75-80.

Rønne, V., McKnight, U.S., Sonne, A.Th., Devlin, J.F., Bjerg, P.L. 2017. Contaminant mass discharge to streams: comparing direct groundwater velocity measurements and multi-level groundwater sampling with an in-stream approach. *Journal of Contaminant Hydrology*, v. 206, 43-54.

Walter, K., Devlin, J.F. 2017. Application of 3D printing to the manufacturing of groundwater velocity probes (PVPs). *Groundwater Monitoring and Remediation*, doi: 10.1111/gwmr.12210.

Devlin, J.F., Schillig, P.C. 2017. HydrogeoEstimatorXL: An Excel-based tool for estimating hydraulic gradient magnitude and direction. Technical Note in the *Hydrogeology Journal* DOI 10.1007/s10040-016-1518-4.

Devlin, J.F. 2016. Sensitivity analyses of the theoretical equations used in point velocity probe (PVP) data interpretation. *Journal of Contaminant Hydrology*, v. 192, 140-145.

Schillig, P.C., Devlin, J.F., Rudolph, D. 2016. Upscaling point measurements of groundwater velocity for enhanced site characterization in a glacial outwash aquifer. *Groundwater*, v. 54, no. 3, 394-405.

Firdous, R., Devlin, J.F. 2015. Visualizations and optimization of iron-sand mixtures for permeable reactive barriers. *Ground Water Monitoring and Remediation*, v. 35, no. 4, 78-84.

Devlin, J.F. 2015. HydrogeoSieveXL: an Excel-based tool to estimate hydraulic conductivity from grain-size analysis. *Hydrogeology Journal*, v. 23, 837-844.

Rudolph, D., Devlin, J.F., Berkeris, L. 2015. Challenges and a strategy for agricultural BMP monitoring and remediation of nitrate contamination in unconsolidated aquifers. *Groundwater Monitoring and Remediation*, v. 35, no. 1, 97-109.