

# PhysioML – An Extensible Markup Language for Physiological Modeling

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We have developed an Extensible Markup Language (XML) for physiological modeling (PhysioML) to support our efforts to implement a wide range of physiological models in a client-server distributed environment.<sup>1</sup> This XML is different than previous markup languages (cellML, SBML, AnatML) in that it will support a broader range of modeling problems, including those for which more specific physiological parameters are supplied. We have developed a number of physiological models using PhysioML including: cardiovascular flow,<sup>2</sup> lung fluid transport,<sup>3</sup> inhalation of mercury vapor,<sup>4</sup> and lead.<sup>5</sup> In this talk we will demonstrate the modeling language, show how physioML is utilized in each of these quite different modeling problems, and discuss our vision for extensions of this language. In addition, we will discuss how PhysioML will be used to implement web-based access to the age- and gender-specific physiological database (Human Electronic Physiological Database) being developed for the U. S. Environmental Protection Agency.

## References:

1. Ward, R. C., et al., Proceedings of the Joint BMES/EMBS Conference (Atlanta, GA), p 1211, 1999.
2. Rideout, Vincent, Mathematical and Computer Modeling of Physiological Systems, Prentice Hall, New Jersey, 1991.
3. Roselli, R.J., et al., *Ann. Biomed. Engin.*, 25:46-61, 1997.
4. Leggett, R. W., N. B. Munro, K. F. Eckerman, *Health Phys.* 81(4):450-455, 2001.
5. Leggett, R. W., *Environ. Health Perspectives*, 101:598- 616, 1993.

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