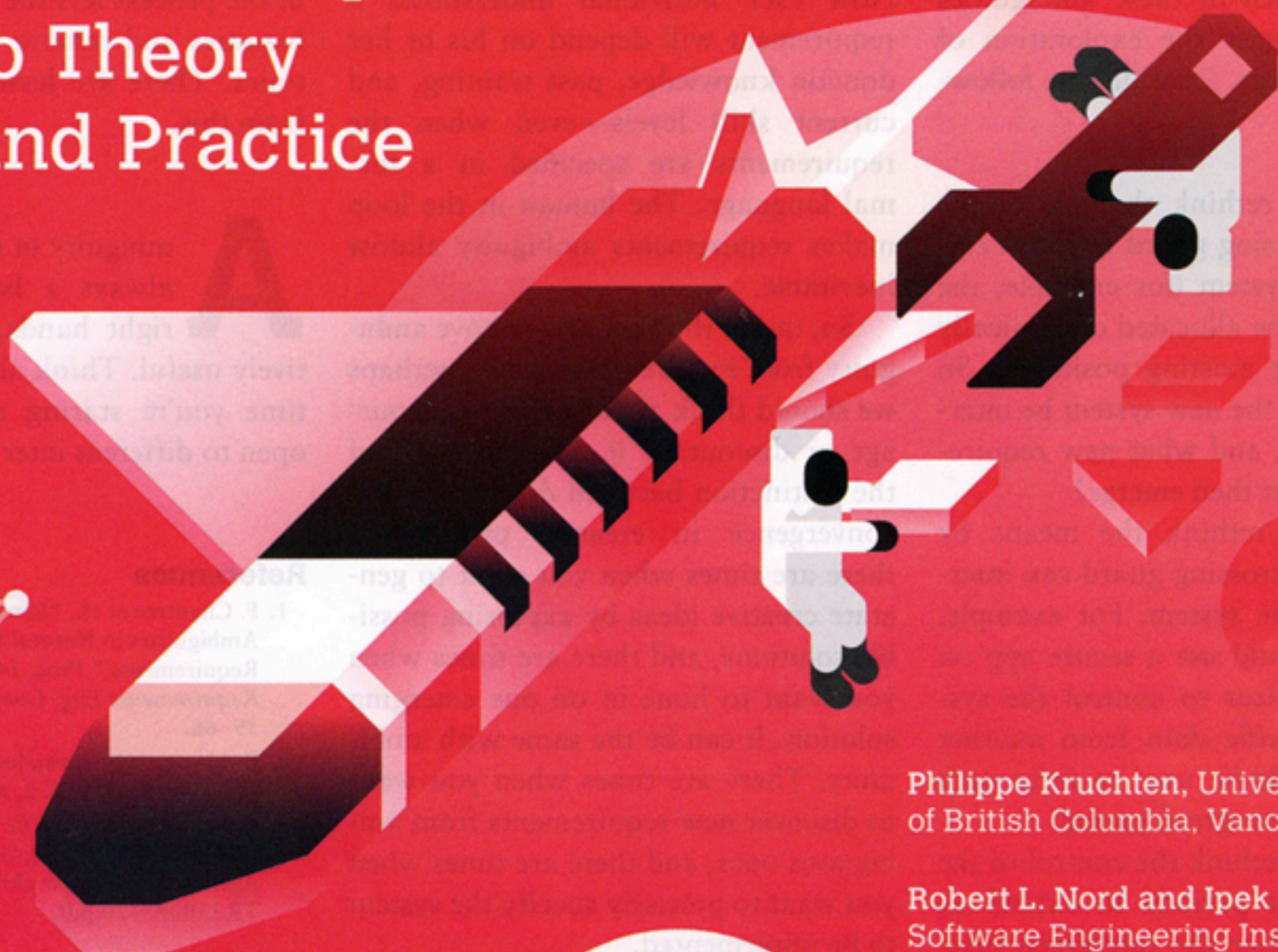


# Technical Debt: From Metaphor to Theory and Practice



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**THE METAPHOR OF** technical debt in software development was introduced two decades ago by Ward Cunningham<sup>1</sup> to explain to nontechnical product stakeholders the need for what we call now “refactoring.” It has been refined and expanded since, notably by Steve McConnell in his taxonomy,<sup>2</sup> Martin Fowler with his four quadrants,<sup>3</sup> and Jim Highsmith and his colleagues from the Cutter Consortium with their model

of the impact of technical debt on the total cost of ownership.<sup>4</sup>

From the original description—“not quite right code which we postpone making it right”<sup>1</sup>—various people have used the metaphor of technical “debt” to describe many other kinds of debts or ills of software development, encompassing broadly anything that stands in the way of deploying, selling, or evolving a software system or anything that adds to the friction from which software development endeavors suffer: test debt, people debt, architectural debt, requirement debt, documentation debt, or just an amorphous, all-encompassing software debt.<sup>5</sup> Consequently, the concept of technical debt

in software development has become somewhat diluted lately. Is a new requirement, function, or feature not yet implemented “requirement debt”? Do we call postponing the development of a new function “planning debt”? The metaphor is losing some of its strength.

Furthermore, once we identify tools such as static code analyzers to assist us in identifying technical debt, there’s a danger of equating it with whatever our tools can detect. This approach leads to leaving aside large amounts of potential technical debt that’s undetectable by tools, such as structural or architectural debt or technological gaps. Gaps in technology are of particular interest because the debt incurred



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