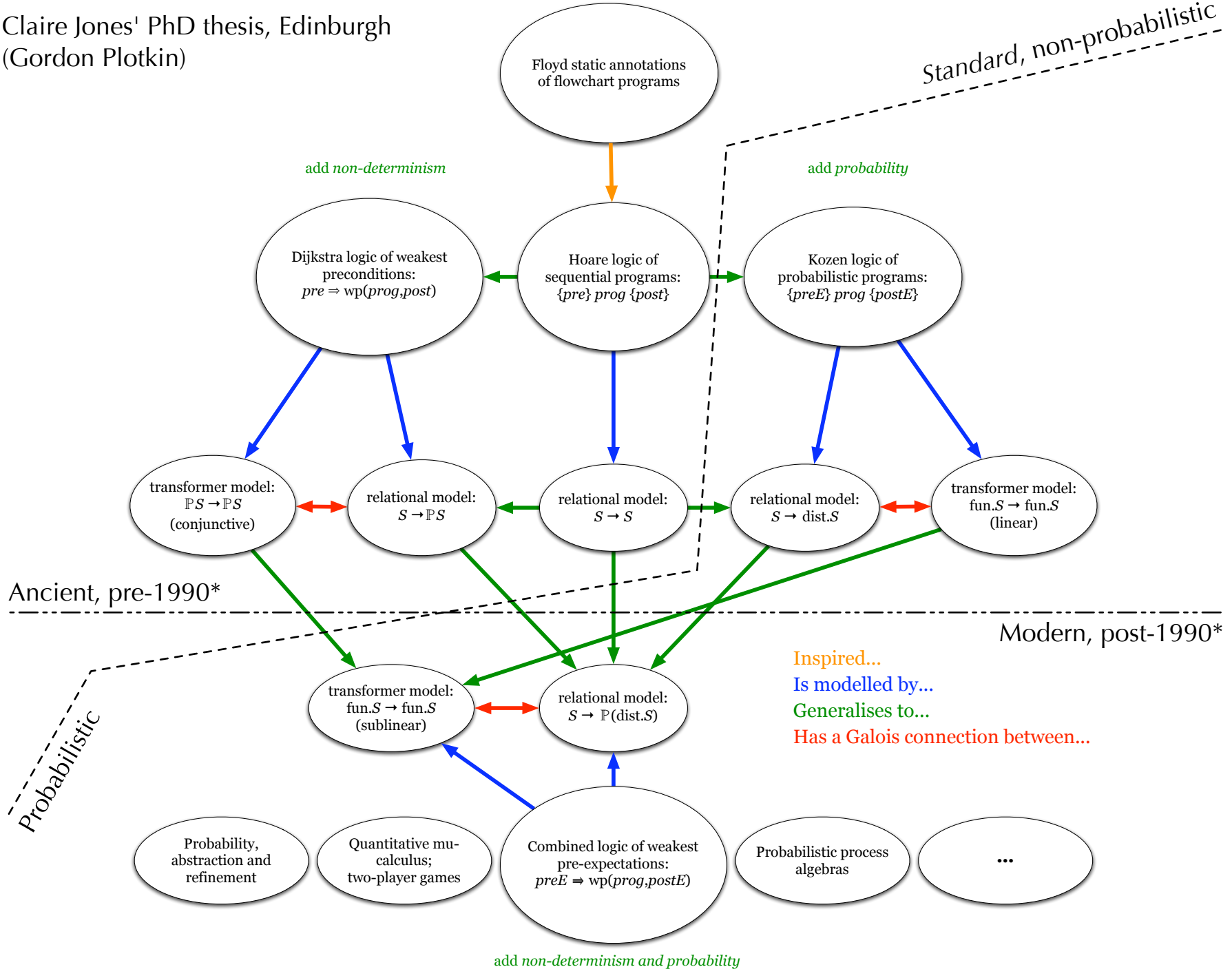
* Claire Jones' PhD thesis, Edinburgh (Gordon Plotkin)
Floyd static annotations of flowchart programs
Standard, non-probabilistic
add non-determinism
add probability
Dijkstra logic of weakest preconditions: pre ⇒ wp(prog,post)
Hoare logic of sequential programs: {pre} prog {post}
Kozen logic of probabilistic programs: {preE} prog {postE}
transformer model: ℙS → ℙS (conjunctive)
relational model: S → ℙS
relational model: S → S
relational model: S → dist.S
transformer model: fun.S → fun.S (linear)
Ancient, pre-1990*
Modern, post-1990*
Probabilistic
transformer model: fun.S → fun.S (sublinear)
relational model: S → ℙ(dist.S)
Inspired...
Is modelled by...
Generalises to...
Has a Galois connection between...
Probability, abstraction and refinement
Quantitative mu-calculus; two-player games
Combined logic of weakest pre-expectations: preE ⇛ wp(prog,postE)
Probabilistic process algebras
...
add non-determinism and probability