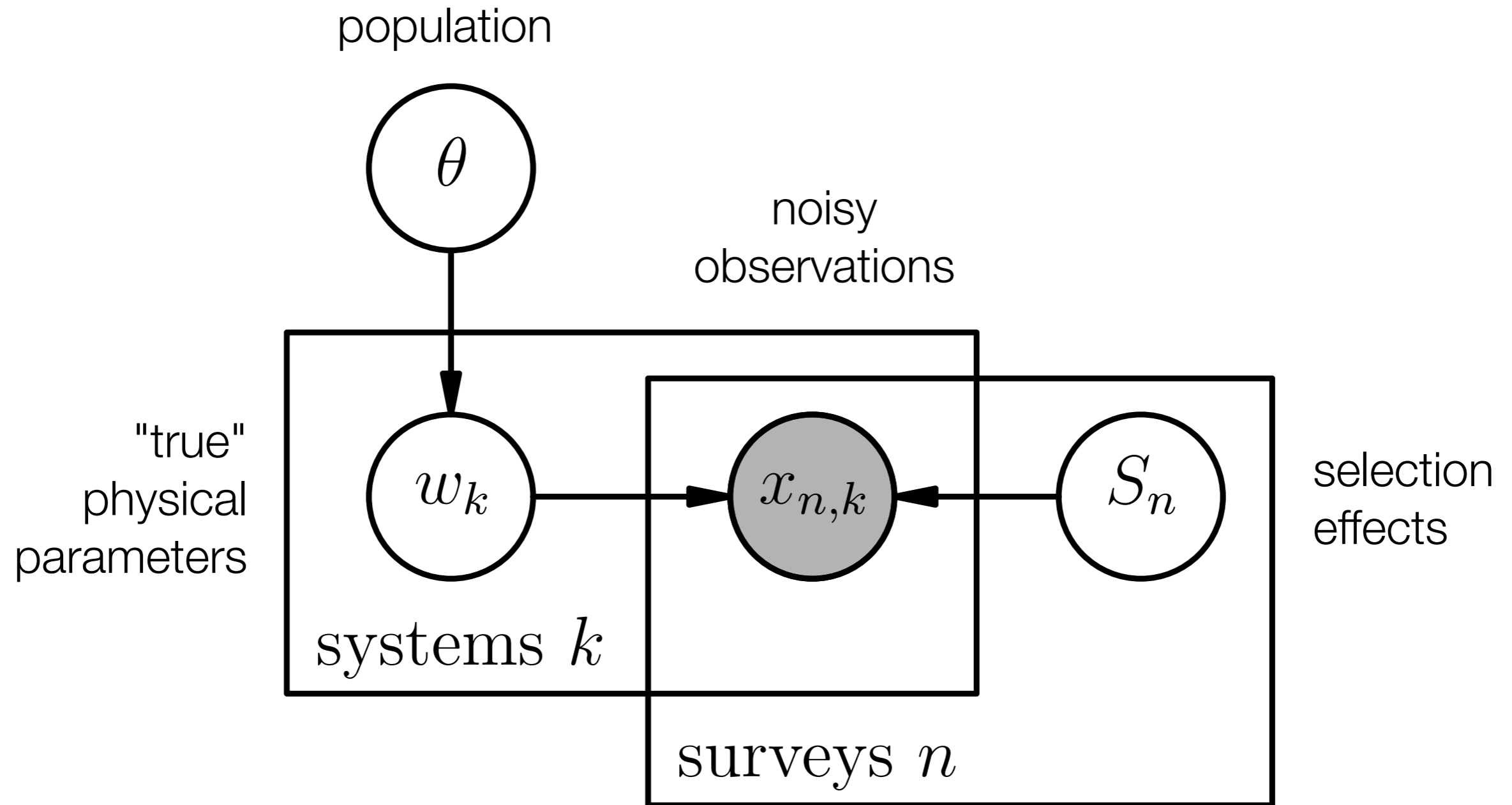treatment of false positives,
dependent parameters,
uncertainties & selection effects

open source tools
applicable to all existing
& future exoplanet missions

# Flexible & robust inference of the exoplanet population

occurrence rate
period, radius, mass,
eccentricity, multiplicity,
mutual inclination, *etc.*

population

$\theta$

noisy
observations

"true"
physical
parameters

$w_k$ → $x_{n,k}$ ← $S_n$

selection
effects

systems $k$

surveys $n$

Probabilistic modeling can be used to **combine surveys**,
take **uncertainties** into account, and measure
the effects of **false positives**

**Single transits** and long-period radial velocity measurements only place **weak constraints** on the parameters of the planets but, with probabilistic modeling, this can be taken into account & these **can still be used for population inference**.
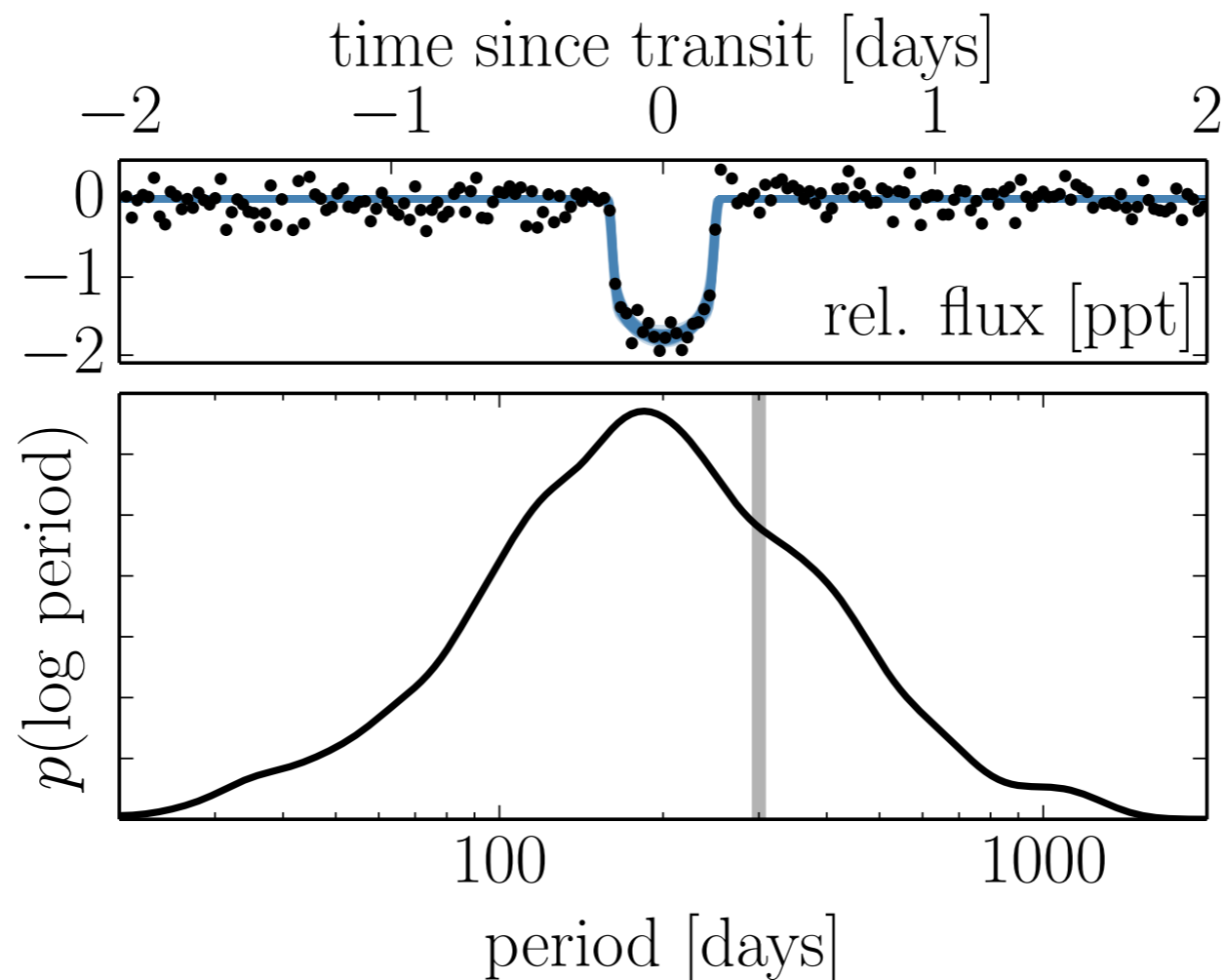


Think how useful this will be for *K2* and *TESS*!

For systems with **multiple planets**, the parameters
are **no longer independent**.
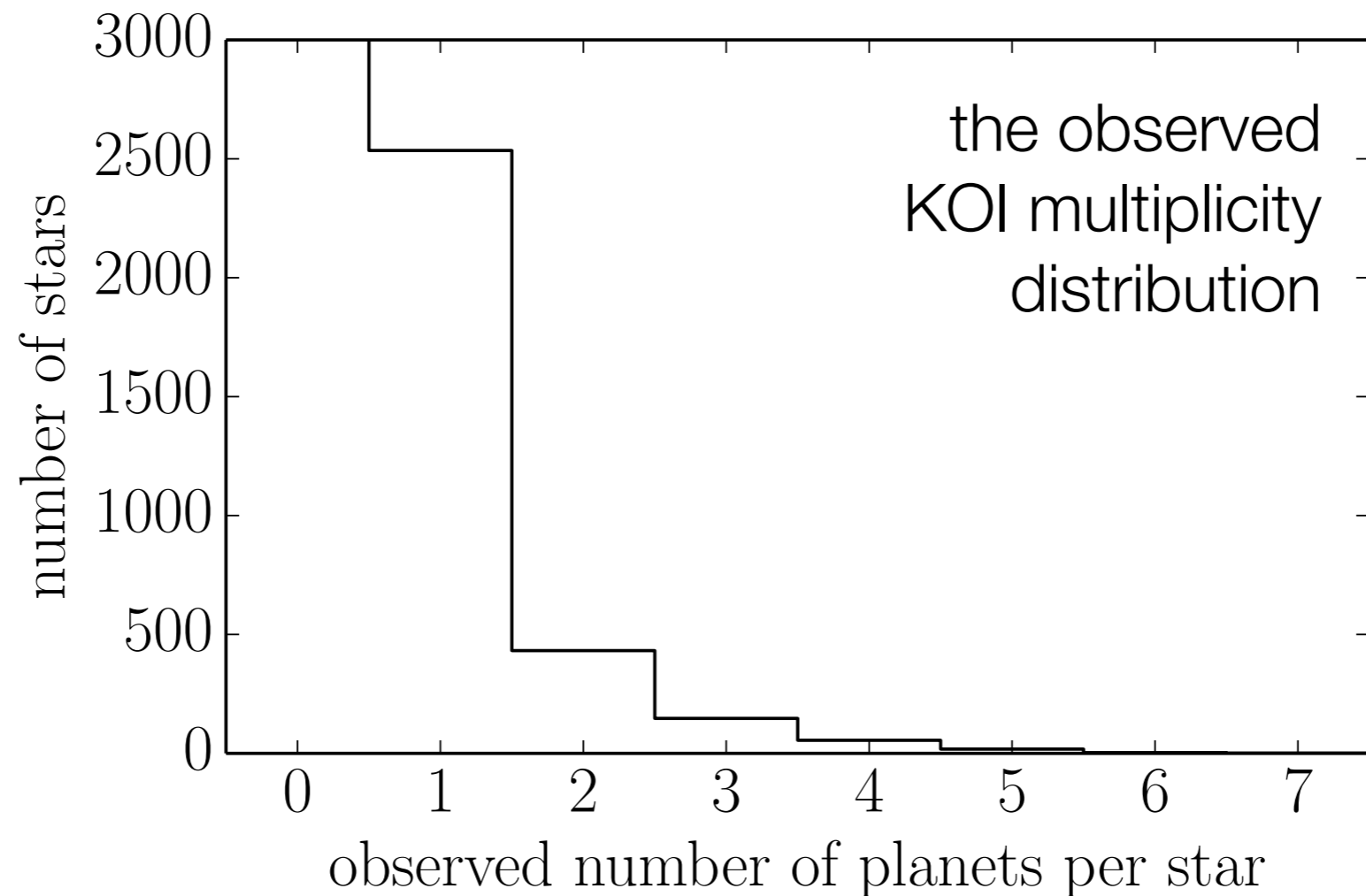


Other methods of population inference—**approximate
Bayesian computation** or **likelihood-free inference**—might
be necessary!